
PONY
سلسلة كتب الاستاذ
SCIENCE
2023
4th
PRIMARY
FIRST TERM
MAIN BOOK
By: Ahmed Omara

Contents



Theme 1: Systems

Living Systems

UNIT 2

Theme 2: Matter and Energy

Motion

Unit 1

Living Systems

Unit Objectives

In this unit, you will learn about:

1. How do living organisms adapt?
2. How do animals and plants use their senses to gather information?
3. How do living organisms communicate and transfer information?

Get Started
What I Already Know





Difficulties that face living organisms to survive:

1. Hot or cold temperature.
2. Availability of food, water or shelter.

How can living organisms adapt to these conditions?

- Over time, living organisms adapt to survive in extreme hot conditions.

Fennec Fox



- Hides in burrows to stay cool in the sunny days.

Camel



- Stores fats in its hump to survive in the desert.

Palm Tree



- Has strong roots to resist strong winds in the desert.

Studying Bats

Bats
الخفافيش



- Bats are nocturnal animals. (Active at night)
  الخفافيش كائنات ليلية؛ أي تنشط في الليل.
- Bats sleep upside down.
  تنام الخفافيش رأسًا على عقب (مقلوبة).
- Bats, like bees and butterflies, can help plants and flowers.
  الخفافيش مثل النحل والفراشات تعمل على مساعدة النباتات.



- Bats can fly fast like birds.
  الخفافيش تستطيع الطيران بسرعة كالطيور.



- Bats locate their prey such as mosquitoes by a property called echolocation.
  الخفافيش تستخدم خاصية تحديد الموقع بالصدى لمعرفة مكان الفريسة مثل البعوض.



Concept 1

Adaptation and Survival

In this concept, we are going to study:

- Types of adaptation:
  - a. Structural adaptation
  - b. Behavioral adaptation
- Adaptation in some animals.
- Adaptation in some plants.
- Adaptation in humans:
  - a. Digestive system
  - b. Respiratory system
- Environmental changes:
  - a. Natural changes
  - b. Human activities

Key Vocabulary

- Adaptation
- Habitat
- Extinct
- Survive
- Reproduce
- Organism
- Camouflage
- Digestive system
- Respiratory system
- Pollution
- Ecosystem
- Predator
- Prey

Lesson 1

Activity 1 Can You Explain?

How do living organisms protect themselves from the extreme heat of the sun?

كيف تتكيف الكائنات الحية مع ظروف البيئة وتحمي نفسها من أشعة الشمس الحارة؟

Desert Lizard (Agama Lizard) سحلية الصحراء	Camel الجمل	Robents & Reptiles القوارض والزواحف
		
By finding and staying in shaded areas. البحث والبقاء في أماكن الظل.	Stores fats in its hump to survive in the desert. يخزن الدهون في سنامه ليتحمل ظروف الصحراء.	By hiding underground in the sand of the desert. بالاختباء تحت رمال الصحراء.

These different ways of protection are known as **adaptation**.

Reasons for Adaptation:



Living organisms use adaptation to:

1. Survive.
2. Reproduce.





Activity 2 Penguin Feet

» Climate is considered one reason for adaptation.

« يعتبر المناخ سببًا من أسباب تكيف الكائنات الحية.

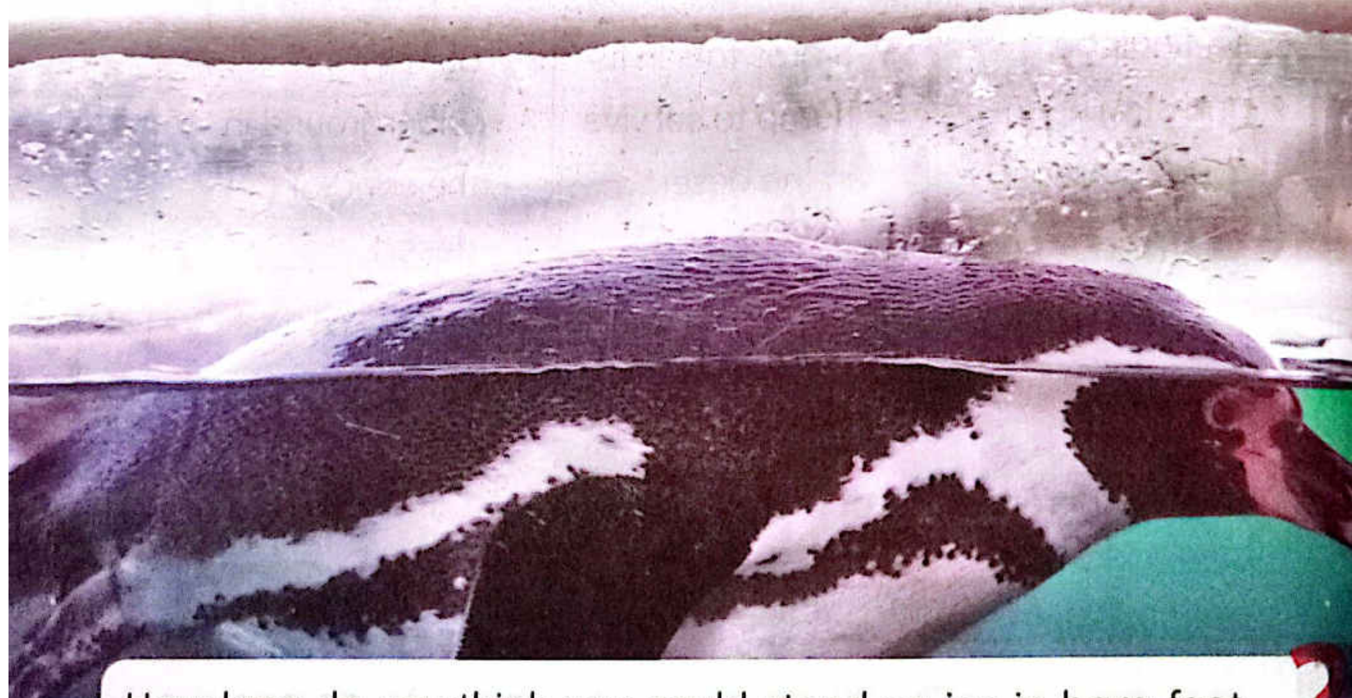
Adaptation of Penguins

» A penguin is a non-flying bird that lives in Antarctica in a polar climate. (The coldest place on Earth)

« يعيش البطريق في مناخ قطبي بالقارة الجنوبية القطبية.

» A penguin has a thick fat layer and dense feather on its body to keep its body warm in the freezing cold.

« يحتوي جسم البطريق على طبقة من الدهون تحت الجلد ويغطي جسده ريش كثيف.
حتى يشعر بالدفء في الأماكن الباردة.



How long do you think you could stand on ice in bare feet

- You would lose feeling in your toes after two minutes.

برأيك كم المدة التي تستطيع فيها الوقوف على الثلج؟

- بالطبع ستفقد الإحساس بأصابعك بعد دقيقتين.

» A penguin's feet have no fat or feathers, but a penguin can stand on ice all day.

» أرجل البطريق لا تتجمد رغم عدم وجود دهون تحت الجلد وهي غير مغطاة بريش كثيف.

How does a penguin keep its feet from freezing?

- The warm blood vessels in its body weave around the cold blood vessels in its feet to heat it up.

- تلتف الأوعية الدموية حول بعضها وعندما تتلامس تنقل الأوعية الدموية الدافئة في جسمه الحرارة إلى الأوعية الدموية الباردة؛ مما يبقي أرجل البطريق دافئة ولا تتجمد.



1. Warm blood moves down from its body to its toes.

1. الدم الدافئ يتحرك من جسمه إلى أسفل.

2. Cold blood moves up from its feet to its body.

2. الدم البارد يتحرك من قدمه إلى أعلى جسده.



Moves from the body down to its toes.

Warm Blood

Blood Vessels

The warm blood vessels weave around the cold blood vessels.

Cold Blood

Moves from its toes up to the body.

Activity 3 Adaptation for Survival

Adaptations التكيف

- They are the characteristics that help living organisms to survive and reproduce in their ecosystem.

هي الخصائص التي تساعد الكائنات الحية على البقاء على قيد الحياة والتكاثر.

Polar Bear الدب القطبي	Brown Bear and Black Bear الدب البني والدب الأسود
	
Ecosystem (Habitat) الموطن	
• Arctic Region القطب الشمالي	• Forests الغابات
Way of Adaptation طريقة التكيف	
• **It has thick white fur.** فراء بيضاء كثيفة To keep it warm and to blend in with the snow to sneak up on its prey. الشعور بالدفء والتخفي بين الثلوج للانقضاض على الفريسة	• **They have dark fur.** فراء داكنة To hide among trees during hunting. التخفي بين الأشجار أثناء الصيد

Camouflage التخفي

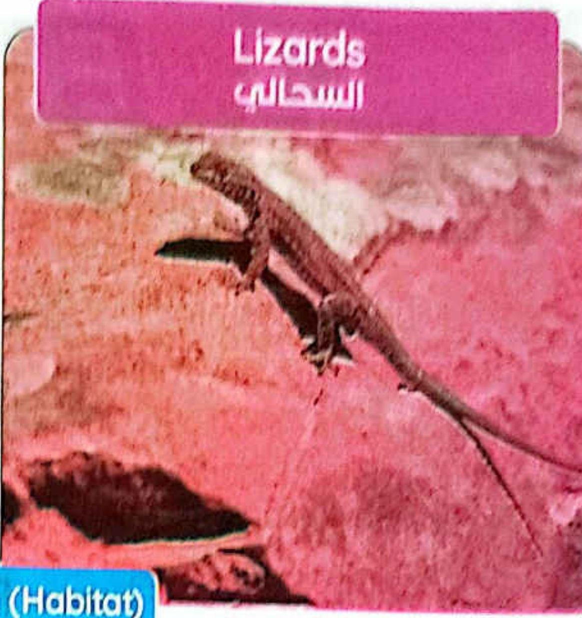
- It is an example of adaptation in which some animals hide from predators or the prey by blending in with the surrounding environment.

هو أحد أنواع التكيف الذي يساعد الحيوانات على الاختباء من الحيوانات المفترسة أو التسلل لفريستها.

Caracal and Fennec Fox
القط البري وثعلب الفنك



Lizards
السحالي



Ecosystem (Habitat)
الموطن

- Caracal and Fennec Fox: Deserts
- Lizards: Deserts between colorful rocks

Way of Adaptation
طريقة التكيف

- Caracal and Fennec Fox: They have tan fur. فراء ذهبية
  To hide and blend in with the desert environment.
  التخفي في رمال الصحراء
- Lizards: They have colorful scales.
  حراشيف ملونة
  To hide among rocks.
  التخفي بين الصخور الملونة في الصحراء

Importance of Camouflage:

[1] Hiding from predators.

[2] Sneaking up on the prey.

Do you know?

Some animals change the color of their coat according to the seasons.

Arctic Fox







1 Choose the correct answer:

1. Living organisms will .... if they adapt to the surrounding environment.
   a. die b. survive c. escape d. extinct
2. The starred agama keeps its body cool in sunny days by ....
   a. swimming in lakes b. finding shaded areas
   c. drinking more water d. breathing rapidly
3. Man wears light clothes to protect himself from ....
   a. cold weather in summer b. hot weather in winter
   c. hot weather in summer d. cold weather in winter
4. Camels store .... in their humps to adapt to the desert environment.
   a. proteins b. fats c. meat d. starch
5. Penguins live in Antarctica, which is considered a .... region.
   a. desert b. forest c. tropical d. polar
6. A polar climate ....
   a. is the hottest place on Earth b. is the coldest place on Earth
   c. looks like the desert climate d. looks like the forest climate
7. A penguin has a .... on its body to keep its body warm.
   a. thin fat layer and dense feathers
   b. thick fat layer and dense feathers
   c. thick fat layer and no feathers
   d. thin fat layer and no feathers
8. If you stand on snow in bare feet, you will lose feeling in your toes after ....
   a. two minutes b. ten minutes
   c. fifteen minutes d. thirty minutes

9. In penguin's feet, the warm blood vessels .... cold blood vessels.
   a. are far from
   b. are close to
   c. are mixed with
   d. weave around

10. Blood vessels in penguin's feet bring .... blood up and .... blood down.
    a. frozen - watery
    b. impure - pure
    c. warm - cold
    d. cold - warm

11. .... helps lions to hide in savannah grasses while watching deer.
    a. Camouflage
    b. Echolocation
    c. Countershading
    d. Trapping

12. All of these animals are considered desert animals, except ....
    a. lizards
    b. fennec foxes
    c. brown bears
    d. caracals

13. Most animals that live in the Arctic region have .... coat.
    a. thick and dark
    b. thin and white
    c. thick and white
    d. thin and dark

14. The fennec fox has .... fur to blend in with the ....
    a. white - snow
    b. brown - forest
    c. sandy - desert
    d. dark - mud

15. The .... coat enables the polar bear to sneak up on its prey.
    a. dark
    b. white
    c. thick
    d. thin

16. A lizard has .... that enable it to hide among rocks.
    a. thick fur
    b. colorful fur
    c. colorful scales
    d. golden scales

17. All of these are examples of camouflage, except ....
    a. brown bears hiding among trees during hunting
    b. polar bears sneaking on their prey in the snow
    c. lizards hiding among colorful rocks
    d. penguins have dense feathers to warm their bodies

2 Write the scientific term:

1. A non-flying bird that has a thick fat layer and dense feathers on its body. (..........)

2. They weave around each other to keep the penguin's feet warm. (..................)
3. It is the place in which a living organism lives. (..................)
4. A change that helps living organisms survive and reproduce. (..................)
5. The ability of an animal to hide from its prey. (..................)
6. A type of bears that has white fur and lives in the Arctic region. (..................)
7. A type of bears that has black fur and lives in forests. (..................)
8. A type of foxes that has tan fur and lives in deserts. (..................)

3 Put (✓) or (✗):

1. Camels store proteins in their humps. ( )
2. The desert lizard searches for water in the sunny days. ( )
3. Humans wear heavy clothes to overcome the cold weather in winter. ( )
4. Antarctica is the hottest place on Earth. ( )
5. A penguin is a non-flying bird that has thick feathers. ( )
6. Humans can stand on snow in bare feet all day. ( )
7. In penguin's feet, warm blood moves up from the feet. ( )
8. Polar bears and penguins live in the Arctic region. ( )
9. Fennec foxes live in deserts, while caracals live in forests. ( )
10. Adaptation is considered an example of camouflage. ( )

4 Complete the following sentences:

1. Camels store .... in their humps to adapt to the desert environment.
2. Desert lizards search for .... in the sunny days.
3. Humans wear .... clothes in summer to avoid .... weather, while they wear .... clothes in .... to avoid cold weather.

4. A .... is a non-flying bird that lives in the .... that is the coldest place on Earth.
5. A .... can stand on snow all day, while .... can't.
6. In a penguin's feet, ... blood moves from the body down to the feet.
7. .... helps animals survive and reproduce in their ecosystem.
8. A .... has white fur and it lives in the .... region.
9. A brown bear lives in ...., while a caracal lives in ....
10. A fennec fox has .... fur to blend in with the desert landscapes.
11. .... is an example of adaptation.
12. .... and .... are from animals that live in the polar environment.
13. Some types of lizards have colorful .... to hide in the rocks.

5 Complete the following table:

P. O. C.	Fennec Fox	Polar Bear	Black Bear
Habitat	....	....	....
Fur Color	....	....	....

6 Choose from column (A) what suits it in both columns (B) & (C):

Column (A)	Column (B)	Column (C)
1 Penguin	a. lives in forests.	a. has white fur.
2 Brown bear	b. lives in oceans.	b. has brown fur.
3 Fennec fox	c. lives in the Arctic region.	c. has dark fur.
4 Polar bear	d. lives in Antarctica.	d. has dense feather.
	e. lives in deserts.	e. has tan fur.

1 .... 2 .... 3 .... 4 ....

7 Study the following, then answer the questions:

Figure (1)	Figure (2)	Figure (3)	Figure (4)	Figure (5)	Figure (6)

1. Figures (..........) and (..........) live in polar regions.
2. Figure (..........) can blend in with the desert environment.
3. Figures (..........), (..........) and (..........) are desert animals.
4. Figure (..........) stores fats in its hump.

8 Give reasons for:

1. Adaptation is necessary for all living organisms.
   ....
2. People wear light clothes in the summer.
   ....
3. A penguin has dense feathers on its body.
   ....
4. A penguin can stand on the ice all day.
   ....
5. Some animals undergo camouflage.
   ....

9 What happens if:

1. An animal can't adapt to its surrounding environment.
   ....
2. We conduct an experiment to transfer penguins from Antarctica to the desert.
   ....

Lesson 2



Activity 4 Types of Adaptations

Types of Adaptations أنواع التكيف

Point of Comparison	Structural Adaptation (Physical) تكيف تركيبي	Behavioral Adaptation تكيف سلوكي
Definition	A change that happens in the structure of the animal's body. التغير الذي يحدث في جسم الحيوان.	A change that happens in the behavior of an animal. التغير الذي يحدث في سلوك الحيوان.
Examples	The blood vessels in a penguin's feet. الأوعية الدموية في أرجل البطريق  The thick fur of the polar bear. الفرو الكثيف للدب القطبي 	A desert lizard looks for shaded areas in the hot sun. تبحث سحلية الصحراء عن أماكن الظل Migration of birds. هجرة الطيور 



- **Animals that are flexible about what they eat and where they hunt are well-adapted for survival.**

1 Fennec Fox ثعلب الفنك

Habitat: Desert

Structural Adaptation:

- **It has tan-colored fur:** له فراء بنية داكنة
  - a. To hide in the sandy and rocky environment. للتخفي في البيئة الرملية والصخرية
  - b. To protect it from the hot sun. لحمايته من أشعة الشمس
- **It has extra-large ears:** له آذان طويلة
  To lose heat and cool its body. ليفقد الحرارة منها ويبرد جسمه
- **It has a special ear shape:** له شكل أذن خاص
  To strengthen the sense of hearing for hunting. لتقوية حاسة السمع للصيد

Behavioral Adaptation:

- **It pants like dogs:** (700 breaths per minute) يلهث مثل الكلب
  To cool its body. لتبريد جسمه
- **It stays in burrows on sunny days:** يبقى في الجحور أثناء الصباح
  To stay cool. ليبقى جسمه دافئًا
- **It eats different kinds of food**
  like insects, fruits, plant roots and prey remains.
  Because it is hard to find any food in the desert.
  يأكل أنواع مختلفة من الغذاء مثل الحشرات والفواكه وجذور النباتات وبقايا الفريسة لندرة الأكل في الصحراء.



2 Arctic Fox الثعلب القطبي

Habitat: Tundra (cold) desert

Structural Adaptation:

- **It has thick fur coat** — له فراء كثيفة
  To help it stay warm. — ليبقى جسمه دافئًا
- **It has white fur in winter and brown fur in summer:**
  يتحول الفراء من اللون الأبيض إلى اللون البني عند ذوبان الجليد
  To hide from its prey in any season. — للاختباء من الفرائس في أي فصل.
- **It has short ears and legs:** — له أذنان وأرجل قصيرة
  To help it stay warm. — ليبقى جسمه دافئًا
- **It has a special ear shape:** — له شكل أذن خاص
  To strengthen the sense of hearing for hunting. — لتقوية حاسة السمع للصيد

Behavioral Adaptation:

- **It stays in burrows at night:** — يبقى في الجحور أثناء الليل
  To stay warm. — ليبقى جسمه دافئًا
- **It eats different kinds of food**
  like insects, fruits, plant roots and prey remains.

Because it is hard to find any food in the desert.

يأكل أنواع مختلفة من الغذاء مثل الحشرات والفواكه وجذور النباتات وبقايا الفريسة لندرة الأكل في الصحراء.







قرش الثور



Habitat: It lives in fresh and salt water.

Structural Adaptation:

- It uses a camouflage strategy called "countershading".
  It has a dark back and white belly: To sneak up on the prey.
  له ظهر أسود وبطن أبيض ويستخدم إستراتيجية التخفي التي تسمى التباين اللوني للصيد والانقضاض على الفريسة.
- It can hunt in salt and fresh water, unlike other sharks.
  يستطيع الصيد في المياه العذبة والمالحة بعكس القروش الأخرى.
- It has sharp teeth:
  To tear the prey's flesh. يملك أسنانًا حادة لتمزيق لحم الفريسة.

Behavioral Adaptation:

- It hunts during the day and at night, so its prey can't predict the hunting time. يستطيع الصيد بالليل أو النهار وبالتالي لا تتوقع الفريسة وقت الهجوم.



» In fresh water, bull sharks have less competition for finding food. Because no other sharks live in fresh water.

Countershading التباين اللوني

» When a fish swimming <u>above</u> the bull shark looks <u>down</u>, the fish may not see the shark in the <u>*shadows*</u> due to its <u>*dark back*</u>.	» When a fish swimming <u>under</u> the bull shark looks <u>upward</u>, the bull shark <u>*blends*</u> with the light of the sun due to its <u>*white belly*</u>.





Activity 5 The Panther Chameleon

- The starred agama is a lizard that adapted to survive in hot and dry desert.
- The panther chameleon is a lizard that adapted to live in tropical rainforests.



4 Panther Chameleon حرباء النمر

Habitat: It lives in tropical rainforests.

Structural Adaptation:

- **It has bright colored scales:** To blend in with the surrounding environment.

  أجسام السحالي مغطاة بالحراشيف الملونة للاختباء من الفرائس.

- **Its eyes move in opposite directions:** One eye searches for food and the other eye to avoid danger.

  عيون الحرباء تتحرك في اتجاهات متعاكسة عين تبحث عن الفريسة وعين أخرى لتجنب الخطر.

- **It has a very long sticky tongue:** To hunt insects for feeding.

  لديها لسان قوي وطويل لصيد الحشرات.

- **It has a V-shaped feet and a tail like a hand:** To hold the branches of trees tightly.

  لها أقدام تشبه الحرف V وذيل مثل اليد لتمسك بقوة أفرع الأشجار.

Behavioral Adaptation:

- **In danger, it scares its attacker by:**
  - Puffing up its body with air.
  - Opening its mouth wide.
  - Changing the color of its scales.

عندما تشعر بالخطورة فإنها تخيف أعداءها:
- تنفخ جسمها بالهواء.
- تفتح فمها باتساع.
- تغير لون الحراشيف.





1 Choose the correct answer:

1. When a man wears heavy clothes in winter to protect himself from cold weather, it is considered an example of .... adaptation.
   a. structural b. behavioral c. physical d. functiona
2. Which of the following is an example of physical adaptation?
   a. Migration of some animals.
   b. Desert lizards searching for shaded areas.
   c. The blood vessels in a penguin's feet
   d. Fennec foxes panting as dogs.
3. The Arctic fox has .... ears to .... its body.
   a. short – warm b. long - cool
   c. short – cool d. long – warm
4. The fennec fox cools its body by all the following, except that ....
   a. it pants like dogs b. it lives in burrows
   c. it eats different types of food d. it has extra-large ears
5. .... change the color of their fur every six months.
   a. Fennec foxes b. Arctic foxes
   c. Penguins d. Panther chameleons
6. Both the Arctic fox and the fennec fox feed on .... to survive in extreme climates.
   a. insects b. roots of plants
   c. prey remains d. all the previous
7. The Arctic fox lives in ....
   a. Antarctica b. tundra desert
   c. Amazon forests d. savannah forests
8. A fennec fox takes up to ...... breaths per minute to cool its body.
   a. 500 b. 600 c. 700 d. 800
9. Both fennec foxes and Arctic foxes are similar in all the following except that they ....
   a. live in extreme climates b. pant like dogs
   c. eat different types of food d. have a strong sense of hearing

10. Hiding in burrows for fennec foxes belongs to .... adaptation.
    a. structural only
    b. behavioral only
    c. a & b
    d. no correct answer
11. The ability of the Arctic fox to change the color of its fur in different seasons is .... adaptation.
    a. structural only
    b. behavioral only
    c. a & b
    d. no correct answer
12. The bull shark is the only shark existing in the .... and it has less competition for finding food.
    a. pacific ocean
    b. deep sea
    c. Amazon rivers
    d. tropical forests
13. The bull shark uses a strategy called .... to sneak up on its prey.
    a. teamwork
    b. echolocation
    c. bating
    d. countershading
14. The ability of a bull shark to hunt any time belongs to .... adaptation.
    a. structural only
    b. behavioral only
    c. a & b
    d. no correct answer
15. When the color of a panther chameleon changes from yellow to green, it means that it moved from a .... area to a .... area.
    a. sandy – rocky
    b. rocky - sandy
    c. sandy - planted
    d. sandy - muddy
16. All the following help the panther chameleon in hunting, except ....
    a. its long sticky tongue
    b. each eye moves independently
    c. it has a tail like a hand
    d. having bright colored scales
17. Panther chameleons have .... -shaped feet.
    a. U
    b. V
    c. S
    d. O
18. A panther chameleon puffs up its body with air and opens its mouth wide to ....
    a. hold the branches of trees tightly
    b. scare its attacker
    c. hide from its prey
    d. store fats and proteins

2 Complete the following sentences:

1. Bird migration is considered an example of ________ adaptation.
2. Both of ________ and ________ live in extreme weather.
3. The short ears help a fox to ________ its body, while large ears help another fox to ________ its body.
4. The fennec fox has ________ fur to hide in ________ environment.
5. When the ice melts and the summer approaches, the fur of the Arctic fox turns from the ________ color to the ________ color.
6. The ears of the Arctic fox are ________ than the ears of the fennec fox.
7. The ________ fox stays in burrows during day, while the ________ fox stays in burrows at night.
8. A bull shark uses ________ strategy to sneak up on its prey.
9. A bull shark has more competition in hunting their prey in ________ water than in ________ water.
10. Each eye of a panther chameleon moves ________, one eye searching for ________ and the other eye ________ .

3 Write the scientific term:

1. A type of adaptation including activities that help an animal to survive. (________)
2. An animal that can hide from its enemies through countershading. (________)
3. An animal that has large ears to hear its prey on sand. (________)
4. An animal whose fur color changes as the seasons change. (________)
5. A type of adaptation that includes changing some parts of the animal's body. (________)

4 Put (✓) or (✗):

1. Adaptation is necessary for the survival of all living organisms. (   )

2. The fennec fox pants like dogs to stay warm during night. (   )
3. The fennec fox has tan fur to hide in the sandy environment. (   )
4. By the beginning of winter, the color of the coat of the Arctic fox changes from white to brown. (   )
5. It is easier for bull sharks to hunt in rivers than in sea. (   )
6. All types of sharks live in salt water only. (   )
7. A bull shark uses echolocation strategy to sneak up on its prey. (   )
8. The panther chameleon puffs up its body to face any danger. (   )

5 Compare between the following:

P. O. C.	Fennec Fox	Arctic Fox
Habitat	....	....
Fur Color	....	....
Shape of Ears	....	....

6 Determine the type of adaptation in the following:

	Structural	Behavioral
1 The blood vessels in penguin's feet.	✓	
2 The desert lizard looks for shade in the hot sun.		
3 Migration of some animals.		
4 The fennec fox pants like dogs.		
5 The fennec fox has extra-large ears.		
6 The Arctic fox eats different kinds of food.		
7 The bull shark hunts in salt and fresh water.		
8 The bull shark has sharp teeth.		

7 Choose from column (A) what suits it in both columns (B) & (C):

Column (A)	Column (B)	Column (C)
1 Fennec fox	a. has humps.	a. to capture insects.
2 Arctic fox	b. has sharp teeth.	b. to store fats.
3 Panther chameleon	c. pants like dogs.	c. to warm its body.
4 Bull shark	d. has a long sticky tongue.	d. to tear the prey.
	e. has short ears.	e. to cool its body.

1 .... 2 .... 3 .... 4 ....

8 Give reasons for:

1. Both the fennec fox and the Arctic fox can adapt to extreme climates.
....
2. The fennec fox has extra-large ears, while the Arctic fox has small ears.
....
3. The fennec fox and the Arctic fox adapted to eat different kinds of food.
....
4. Some animals undergo camouflage.
....
5. The bull shark has sharp teeth.
....
6. In fresh water, a bull shark finds less competition in finding food.
....
7. Each eye of the panther chameleon works independently.
....
8. The panther chameleon has V-shaped feet and a long sticky tongue.
....

9 What happens if:

1. The fennec fox has small ears. ....
2. The panther chameleon is exposed to danger.
....
3. The bull shark moves from salt water to fresh water.
....

Lesson 3

Activity 6 Plant Adaptations

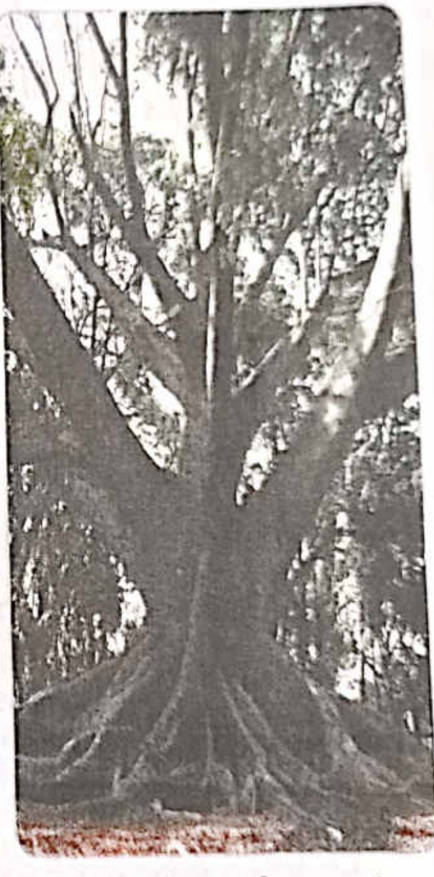
» Plants can grow everywhere that sunlight shines, and they have structural and behavioral adaptations like animals that help them survive in different environments.

« تستطيع النباتات العيش في أي مكان تصله الشمس ولها تكيف تركيبي وسلوكي مثل الحيوان لتستطيع البقاء.



Cactus (in deserts)

Pine (in snow)



Kapok (in forests)



Plants have behavior and can develop it to survive.

» **Example:** Venus flytrap has behavioral adaptation for catching insects.

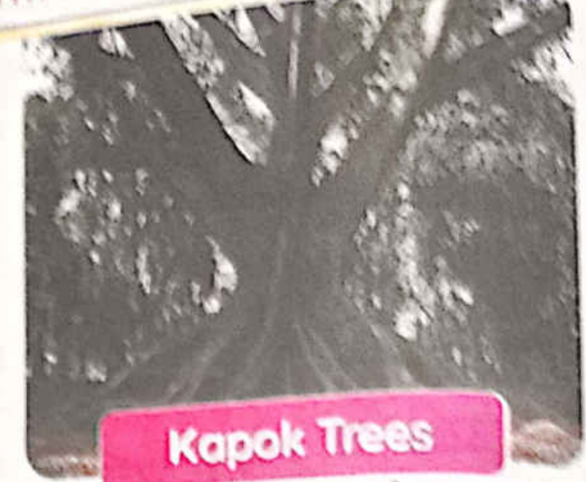


We will study two terrific trees, which are:



Acacia Trees

أشجار السنط



Kapok Trees

أشجار الكابوك

Both of them are "umbrella-shaped trees"

Live in

savannah forests

in Southern Africa

- They are grassland habitats.
- Their temperature is mild.
- There is extreme lack of water and drought conditions.



- إنها مواطن عشبية.
- درجة حرارتها معتدلة.
- هناك نقص شديد في المياه وموجات جفاف.

Live in

Amazon rainforests

in Brazil

- They are rainforests, where it is rainy most of the year and it is easy to find water.
- They have soggy soil.
- They are characterized by strong winds.



- إنها غابة ممطرة ويتساقط المطر معظم أوقات السنة ويكون الماء متوفرًا بكثرة.
- لها تربة طينية (رطبة).
- تتميز برياحها القوية.

1 Acacia Tree

Habitat: It grows in the savannah forests in Africa.

Structural Adaptation

1 Roots الجذور

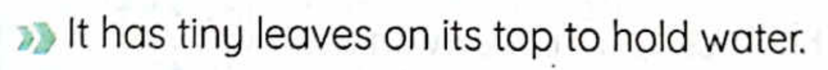


- It has a very long root that grows directly downward, known as a "taproot":
  To search for water in deep soil
  (To reach 35 meters below the soil).
- لها جذر طويل جدًا ينمو للأسفل يعرف بالجذر الوتدي.
  للبحث عن المياه في أعماق التربة.

2 Trunk الجذع

- It stores water in its trunk as a camel stores fats in its hump.
- تخزن الماء في جذعها كما يخزن الجمل الدهون في السنام.
- Its trunk is very long that only a giraffe can reach its leaves.
- جذعها طويل جدًا حيث لا يصل إلى أوراقها إلا الزرافة فقط.

3 Leaves الأوراق





- It has tiny leaves on its top to hold water.
- لها أوراق صغيرة تنمو على قمتها لتساعدها على الاحتفاظ بالمياه.
- The leaves have sharp spines to protect it from hungry animals.
- أوراقها لها أشواك حادة لحمايتها من الحيوانات الجائعة.

Behavioral Adaptation

- It defends itself by producing a poison when an animal eats its leaves.
- تدافع عن نفسها بإفراز سمٍّ عندما يقترب منها أي حيوان جائع.
- It sends smelly messages to the nearby acacia trees to start making the same poison.
- ترسل رسائل كريهة الرائحة لتحفز باقي شجر الأكاسيا على إفراز نفس السمّ.

2 Kapok Tree

Habitat: It grows in the Amazon rainforest of Brazil.

» A kapok tree emerges high above all other trees reaching 70 meters tall.

Structural Adaptation

1 Roots الجذور



» It has large wide roots, called "buttress roots".

« لها جذور كبيرة وعريضة تسمى الجذور الداعمة.

» The roots grow up around the trunk:

(Start from 5 meters above the soil).

To hold the tree firmly in the soggy soil.

« تنمو جذورها الدعامة للأعلى حول الجذوع.

لتثبيت الشجرة بقوة في تلك التربة الرطبة.

2 Leaves الأوراق



» It has hand-shaped leaves with narrow parts:

To allow the wind to move gently without tearing or cutting it.

« لها أوراق على شكل كف اليد بأجزاء صغيرة.

لتسمح بتحرك الرياح من خلالها دون أن تتمزق.

Behavioral Adaptation

» It sends messages by wind to attract bats to its delicious-smelling flowers.

« تستخدم الرياح لإرسال رسائل تجذب الخفافيش لرائحة زهورها الطيبة.



» The wind carries tree's fluffy yellow seeds across the forest.

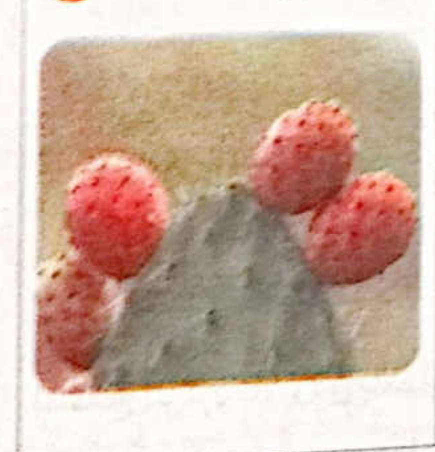
تحمل الرياح البذور الصفراء الرقيقة وتطوف بها في أنحاء الغابة.



Examples of plants structural adaptation in humid environments:

Plant	Habitat	Structural Adaptation	Reason
1 Water Lily	Wetland المستنقعات	It has wide leaves floating on water. لها أوراق عريضة تطفو على سطح الماء.	To absorb the sunlight. لامتصاص أشعة الشمس.
2 Mangrove Tree 	Saltwater المياه المالحة	It has long and strong roots. لها جذور طويلة وقوية.	To resist waves. لمقاومة الأمواج.
3 Pine Tree 	Snow الجليد	It has a triangular shape and short branches. لها شكل مثلث وفروع صغيرة.	To allow snow to slide easily over it without breaking its branches. لتسمح للجليد بالانزلاق بسهولة عليها حتى لا تتكسر فروعها.
		It has needle leaves. لها أوراق شائكة.	To prevent the plant from losing water. ليمنع النبات من فقد الماء.

Examples of plants structural adaptation in dry environments:

Plant	Habitat	Structural Adaptation	Reason
1 Palm Tree 	Desert الصحراء	It has thick roots and small leaves. لها جذور سميكة وأوراق صغيرة.	To resist strong wind. قاومة الرياح القوية.
2 Acacia Tree 	Savannah forests غابات السافانا	Its branches grow up. تنمو فروعها لأعلى.	To prevent animals from eating it. نع الحيوانات من أكلها.
3 Barbary Fig 	Desert الصحراء	It has sharp spines. لها أشواك حادة.	To prevent animals from eating its leaves. نع الحيوانات من أكل أوراقه.





1 Choose the correct answer:

1. All the following can help plants to grow anywhere, except ....
   a. rains b. sunlight c. its structure d. moving
2. If the plant is taken from its original habitat and is placed into another environment, it may ....
   a. die b. adapt
   c. survive d. all the previous
3. Both acacia trees and kapok trees have the same ....
   a. habitats b. shapes c. roots d. trunks
4. Kapok trees grow and survive in ....
   a. Antarctica b. savannah forests
   c. Amazon rainforests d. tundra
5. .... forests are characterized by drought conditions, while .... forests are characterized by strong winds.
   a. Amazon – savannah b. Savannah – Amazon
   c. Tropical – savannah d. Amazon - tropical
6. A/An .... is the only animal that can eat the leaves of an acacia tree.
   a. elephant b. tiger c. giraffe d. zebra
7. Acacia trees have long roots to survive in dry climates, they're called " .... ".
   a. tuberous b. taproot c. buttress d. fibrous
8. The trunk of an acacia tree stores .... as the hump of a camel stores ....
   a. water – fats b. nutrients – water
   c. water – proteins d. no correct answer
9. Which example is not considered a physical adaptation of an acacia tree?
   a. Its tiny leaves. b. It produces a poison.
   c. Its taproot roots. d. Its long trunk.

10. The acacia tree has a sharp spine to ....
    a. hold water
    b. absorb sunlight
    c. protect itself
    d. resist wind
11. Kapok trees stay firmly rooted in the soggy soil by the .... roots.
    a. tuberous
    b. taproot
    c. buttress
    d. fibrous
12. Kapok trees invite .... to come to its smelly leaves.
    a. bees
    b. insects
    c. birds
    d. bats
13. The .... grows in wetlands, while the .... grows in snow.
    a. mangrove tree – pine tree
    b. pine tree – water lily
    c. water lily – pine tree
    d. cactus plant – acacia tree
14. Water lily has wide leaves floating on water to ....
    a. absorb sunlight
    b. resist strong wind
    c. resist waves
    d. hold water in it
15. Palm trees have .... to resist strong winds.
    a. thin roots and small leaves
    b. thick roots and small leaves
    c. thick roots and large leaves
    d. thin roots and large leaves
16. A pine tree has needle leaves to ....
    a. prevent animals from eating it
    b. prevent the plant from losing water
    c. resist strong winds
    d. absorb sunlight
17. Mangrove trees have long and strong roots to ....
    a. search for water
    b. resist wind
    c. resist waves
    d. hold water
18. A pine tree has .... shape to allow snow to slide over it easily without breaking its branches.
    a. umbrella
    b. triangular
    c. hand
    d. oval
19. .... have sharp spines to prevent animals from eating their leaves.
    a. Barbary figs
    b. Kapok trees
    c. Acacia trees
    d. a & c

2 Write the scientific term:

1. It is a rainforest and is characterized by strong winds and soggy soil.

2. It is a grassland habitat that has drought conditions. (..................)
3. The very long root of an acacia tree. (..................)
4. Wide and large roots that fix kapok trees firmly to the soggy soil. (..................)
5. It is a terrific tree that grows in Amazon rainforests in Brazil. (..................)
6. It is a terrific tree that adapted to survive in savannah forests. (..................)
7. It has a hand shape to allow the wind to move gently without tearing it. (..................)
8. A plant that adapted to survive in snow and has a triangular shape. (..................)
9. A plant that has wide leaves floating on water to absorb sunlight. (..................)
10. A tree that adapted to survive in desert and it resists the strong winds by its thick roots. (..................)
11. A tree that grows in salty water and has a strong long root. (..................)
12. The type of adaptation when a kapok tree attracts bats towards it. (..................)

3 Put (✓) or (X):

1. Plants cannot survive in dry seasons due to the lack of water. (   )
2. Acacia trees grow in savannah forests in Brazil. (   )
3. Kapok trees and acacia trees have umbrella-shaped shape. (   )
4. Savannah forests are grasslands characterized by strong winds. (   )
5. Acacia roots grow downward, while kapok roots grow upward. (   )
6. Buttress roots grow directly downward to search for water deeply. (   )

7. A giraffe is the only animal that can eat from acacia leaves. ( )
8. Storing water in an acacia trunk is an example of structural adaptation. ( )
9. Acacia tree has wide leaves to hold water for a long time. ( )
10. Kapok trees defend themselves by producing a poison when an animal eats their leaves. ( )
11. Kapok trees have hand-shaped leaves with narrow parts. ( )
12. Taproots hold the kapok tree firmly in the soggy soil. ( )
13. Kapok trees send messages by the wind to attract insects to its delicious-smelling flowers. ( )
14. Pine trees have needle leaves to store water in them for a long time. ( )
15. Water lily leaves float on salty water to absorb sunlight. ( )
16. The thick roots help palm trees resist strong winds in the desert. ( )
17. The sharp spines protect Barbary figs from hungry animals. ( )

4 Complete the following sentences:

1. Plants have .... and .... adaptations to survive in any environment.
2. Kapok trees grow in .... in Brazil, while .... grow in savannah forests.
3. Amazon rainforests have .... soil and are characterized by .... winds.
4. Savannah forests have .... conditions and lack of ....
5. The acacia tree has .... roots that grow downward to ....
6. The trunk of an acacia tree stores ...., while the hump of a camel stores ....
7. The .... is the only animal that can reach acacia leaves.

8. Acacia trees and ______ have ______ on their leaves to protect them from hungry animals.
9. The ______ protects itself by producing poison when an animal eats its leaves.
10. The large wide roots in kapok trees are called ______ and they grow ______ to hold the tree firmly in the ______ soil.
11. Kapok trees have ______ leaves to allow wind to move gently without ______ its leaves.
12. ______ are attracted to the delicious-smelling flowers of kapok trees.
13. The ______ lives in wetlands, while the ______ lives in salty water.
14. Pine trees have ______ shape and ______ branches to allow ice to slide on them.
15. Palm trees have ______ roots and ______ leaves to resist ______.
16. Mangrove trees have ______ and ______ roots to resist ______.

5 Cross out the odd word:

1. Taproot – Long trunk – Attract bats – Produce poison
2. Hand shaped leaves – Buttress roots – Attract bats – Sharp spines
3. Palm tree – Pine tree – Barbary fig – Cactus plant
4. Soggy soil – Strong winds – Savannah forests – Amazon rainforests
5. Grassland – Drought conditions – Savannah forests – Amazon rainforests

6 Compare between the following:

1.

P.O.C.	Savannah Forests	Amazon Rainforests
Trees in the Forest	______	______
Characteristics	1 ______ land habitat. 2 ______ conditions. 3 The temperature is ______.	1 ______ soil. 2 ______ to find water. 3 ______ winds.

2

P.O.C.	Acacia Tree	Kapok Tree
Habitat	....	....
Shape	....	....
Roots Name	....	....
Leaves	....	....

3

P.O.C.	Palm Tree	Mangrove Tree
Habitat	....	....
Roots Shape	....	....

4

P.O.C.	Water Lily	Acacia Tree
Habitat	....	....
Leaves Shape	....	....

7 Choose from column (A) what suits it in both columns (B) & (C)

Column (A)

1. Kapok tree
2. Pine tree
3. Water lily
4. Acacia tree

Column (B)

a. lives in savannah forests.
b. lives in Amazon forests.
c. lives in the desert.
d. lives in the snow.
e. lives in wetlands.

Column (C)

a. has needle leaves.
b. has wide leaves.
c. has long and strong roots.
d. has buttress roots.
e. has taproots.

1 .... 2 ....

8 Determine the type of adaptation in the following:

	Structural	Behavioral
1 Taproots in acacia trees.		
2 Acacia trees produce poison when animals eat their leaves.		
3 Barbary figs have spines to protect them from animals.		
4 The hand-shaped leaves that allow wind to move gently through it without cutting its leaves.		
5 The triangular shape of the pine tree.		

9 Study the following figures, then answer the questions:

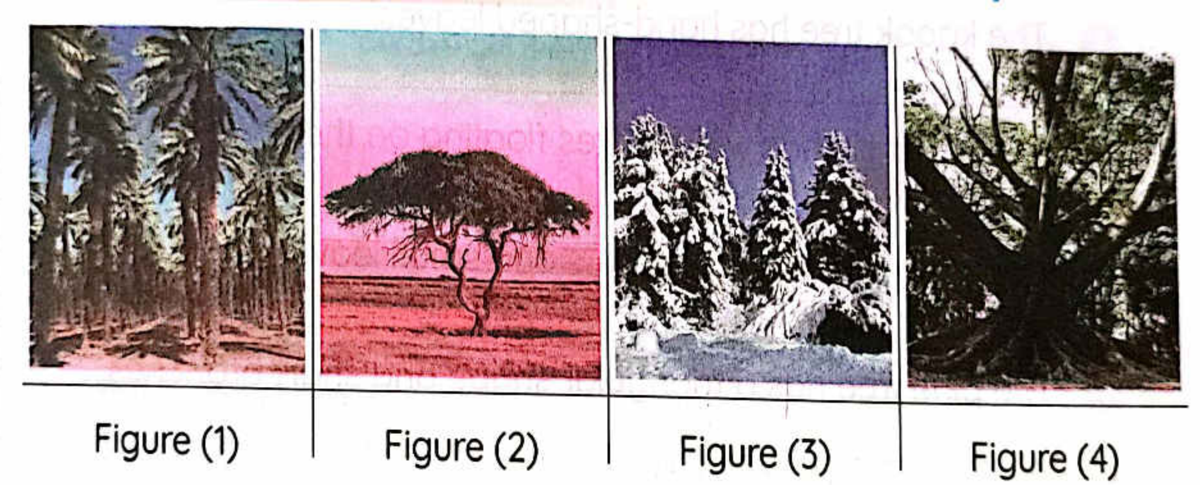


Figure (1) | Figure (2) | Figure (3) | Figure (4)

1 Complete the following sentences:

a. Figure (1) represents a/an .... that lives in .... and it has .... leaves to ....

b. Figure (2) represents a/an .... that lives in .... and it has .... leaves to ....

c. Figure (3) represents a/an .... that lives in .... and it has .... leaves to ....

d. Figure (4) represents a/an .... that lives in .... and it has .... leaves to ....

2. Which one is an umbrella-shaped tree and which one has a triangular shape?

....

....

3. Which tree has taproots and which one has buttress roots?

....

....

10 Give reasons for:

1. Plants can grow everywhere.

....

2. The acacia tree has taproots, while the kapok tree has buttress roots.

....

3. The acacia tree has tiny leaves and sharp spines.

....

4. The kapok tree has hand-shaped leaves.

....

5. The water lily has wide leaves floating on the water.

....

6. The palm tree has thick roots and small leaves.

....

7. The pine tree has a triangular shape and short branches.

....

11 What happens if:

1. Acacia trees have short roots.

....

2. A giraffe starts to eat from acacia leaves.

....

3. A palm tree has thin weak roots.

....

4. A pine tree doesn't have a triangular shape.

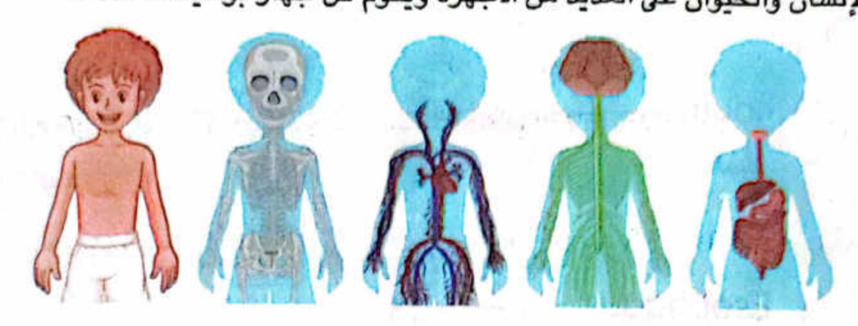
....

Lesson 4

Activity 9 Digestive System

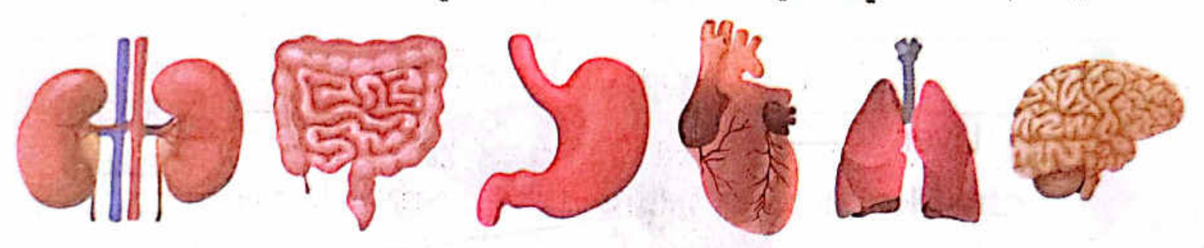
» The bodies of humans and animals consist of different systems, in which these systems work together and each system performs a job.

« يحتوي جسم الإنسان والحيوان على العديد من الأجهزة ويقوم كل جهاز بوظيفة محددة.



» Each system consists of a group of organs that work together to keep the living organism alive.

« كل جهاز في جسم الكائن الحي يحتوي على مجموعة من الأعضاء التي تعمل معًا.



» Digestive and respiratory systems work together to get energy from food and breathing.

« يعمل الجهازان الهضمي والتنفسي معًا للحصول على الطاقة من الغذاء والتنفس.



The body needs energy to:

1. Do activities, such as walking, running,...etc.
2. Do body functions, such as breathing, thinking,...etc.



» To get the nutrients from food, the food must be digested.

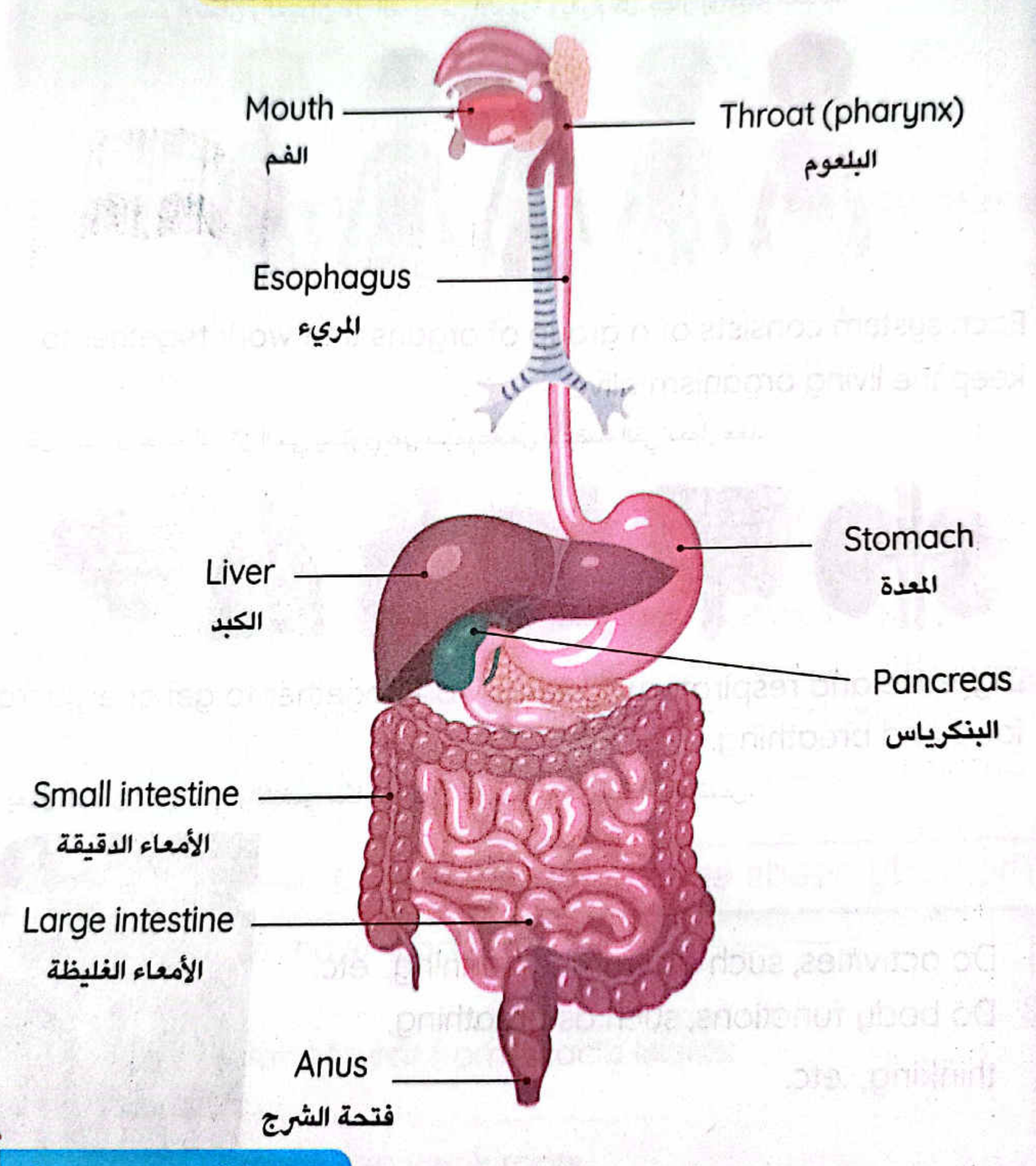
« لا بدَّ أن يتم هضم الطعام حتى نحصل على الطاقة اللازمة.

Digestive System الجهاز الهضمي

A system consisting of a group of organs that help in breaking food into small parts that the body uses to get energy.

هو الجهاز الذي يتكون من مجموعة من الأعضاء وظيفتها هضم الطعام وإمداد الجسم بالعناصر الغذائية.

Structure of the Digestive System



Important Note:

The digestive system starts with the ***mouth*** and ends with the ***anus***.

Digestion Process عملية الهضم

- A process of breaking down food and changing it to chemical substances that the body absorbs to get the needed energy and growth.

عملية تكسير الطعام وتحويله إلى مواد كيميائية يمتصها الجسم من أجل النمو والحصول على الطاقة.

1 Mouth الفم



- Digestion of food begins in the mouth.
- The mouth contains teeth, tongue and saliva.
- Teeth and tongue:
  - Work together to break and crush food.
  - يعملان معًا على تفتيت وتكسير الطعام.
- Saliva:
  - Moistens food to facilitate swallowing food.
  - يقوم اللعاب بترطيب الأكل حتى يسهل بلعه.

2 Esophagus المريء



- It is a long muscular tube that moves the food down into the stomach.
  - هو أنبوب عضلي يقوم بتحريك الطعام إلى المعدة.

3 Stomach المعدة

- It is a muscular organ.

هو عضو عضلي.

- Function of the stomach:
  - It mixes food with stomach acids, and digestive juices containing enzymes to get a soupy liquid.
  - تقوم العصارة المعدية بتحويل الطعام إلى سائل.
  - Food stays in the stomach for a few hours only, then it moves to the small intestine by the stomach muscles.
  - يبقى الطعام في المعدة لبضع ساعات فقط ثم ينتقل إلى الأمعاء الدقيقة بواسطة عضلات المعدة.



4 Small Intestine الأمعاء الدقيقة

» A long winding tube with a length of more than 6 meters.

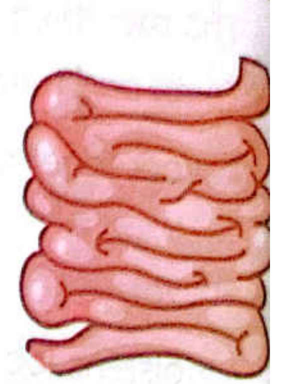
« هو أنبوب طويل يزيد طوله عن ستة أمتار.

» Pancreas and liver:

- They secrete juices in the small intestine to help in breaking down the food into nutrients.

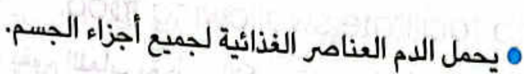
تصب عصارات الكبد والبنكرياس في الأمعاء الدقيقة مما يساعد على هضم الطعام،

- These nutrients are absorbed by the wall of the small intestine to enter the tiny blood vessels.



• تمتص العناصر الغذائية بواسطة جدار الأمعاء الدقيقة لتسري في الأوعية الدموية.

- The blood carries the nutrients to all body parts.



• يحمل الدم العناصر الغذائية لجميع أجزاء الجسم.

» Function of the small intestine:

- Completes digestion of food and absorbs nutrients.

استكمال عملية الهضم وامتصاص العناصر الغذائية.

5 Large Intestine الأمعاء الغليظة

» A tube that starts from the end of the small intestine and ends with the anus.

« هو أنبوب يبدأ من نهاية الأمعاء الدقيقة وينتهي عند فتحة الشرج.

» Function of the large intestine:

- It absorbs water from wastes to become solid wastes, which come out through the anus.

• تمتص الأمعاء الغليظة المياه من الطعام غير المهضوم فيتحول لفضلات صلبة.



To keep your digestive system healthy:

1. Chew the food well.



2. Do not eat many fast meals.



3. Drink a large amount of water.



4. Practice sports regularly.



The path of food through your body

Mouth ▶ Pharynx ▶ Esophagus ▶ Stomach ▶ Small Intestine

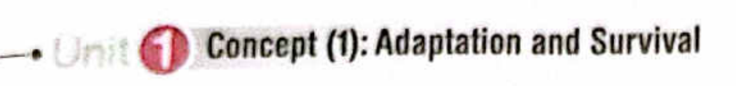
- The digested food is transferred to all body parts.
- The undigested food is transferred to the large intestine to expel it from the body through the anus.



» Digestive organs are connected and organized, so food flows through the process of digestion from the start in the mouth to the end in the anus.







Activity 11 Respiratory System

Respiratory System
الجهاز التنفسي



» During sitting, your breath *slows down*.

« أثناء الجلوس .. تتباطأ أنفاسك.

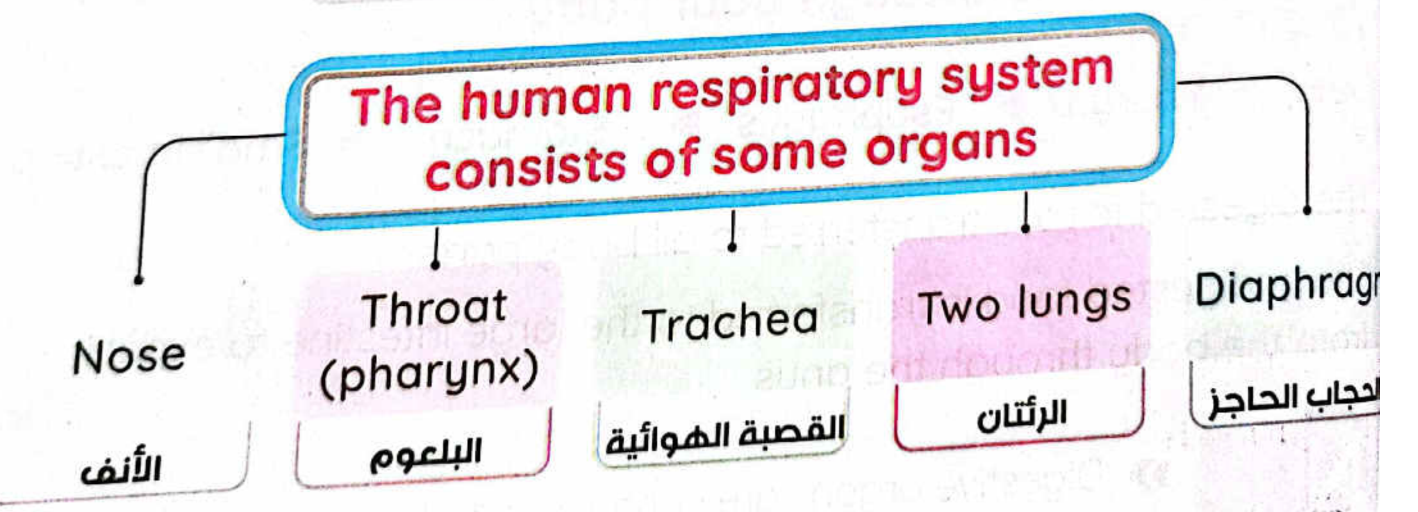
» During running, your breath *quickens*.

« أثناء الجري .. تتسارع أنفاسك.



Respiration Process (عملية التنفس): A process by which the air carrying oxygen gas goes into your body and the air carrying carbon dioxide gas gets out of the body.

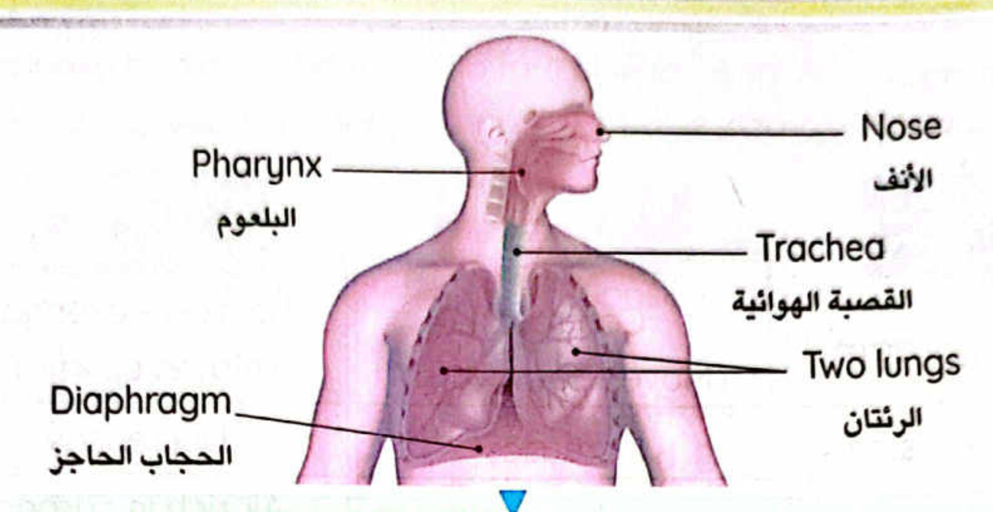
عملية دخول الأكسجين داخل الجسم والتخلص من ثاني أكسيد الكربون خارج الجسم.



Respiratory System (الجهاز التنفسي): It is the system that supplies the body with oxygen gas and gets rid of carbon dioxide gas.

الجهاز الذي يقوم بإمداد الجسم بالأكسجين والتخلص من ثاني أكسيد الكربون.

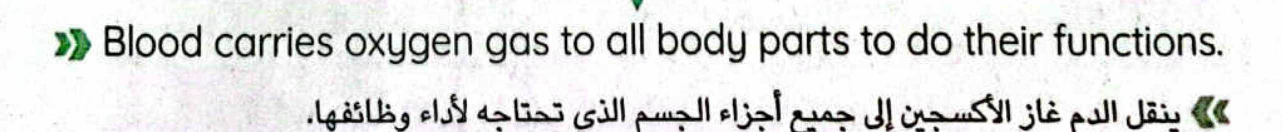
How does the respiratory system work?
كيف يعمل الجهاز التنفسي؟



- During inhalation, the air enters through the **nose** and the **mouth**, then to the **throat** until it reaches the **two lungs** (like 2 balloons) through the **trachea**.
  - أثناء التنفس (الاستنشاق) يدخل الهواء عن طريق **الأنف** و**الفم** إلى **الحلق** حتى يصل إلى **الرئتين** من خلال **القصبة الهوائية**.

- Inside the lung, the trachea is branched into **two bronchi** that are divided into smaller tubes called **bronchioles**.
  - داخل الرئة، تتفرع **القصبة الهوائية** إلى قصبتين تنقسمان إلى أنابيب أصغر تسمى **الشعيبات الهوائية**.

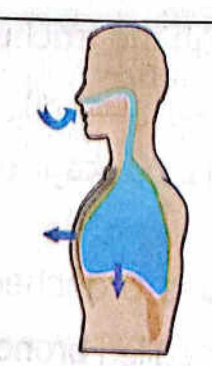
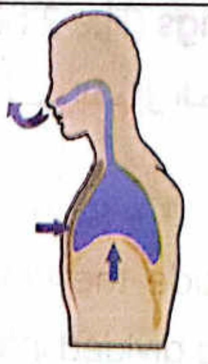
- At the end of these tubes, there are sacs surrounded by blood vessels called "air sacs" **(alveoli)** that extract oxygen from the air.
  - في نهاية هذه الأنابيب توجد أكياس محاطة بأوعية دموية تسمى **الحويصلات الهوائية** التي تقوم باستخراج الأكسجين من الهواء.



- Blood carries oxygen gas to all body parts to do their functions.
  - ينقل الدم غاز الأكسجين إلى جميع أجزاء الجسم الذي تحتاجه لأداء وظائفها.

Respiration includes inhalation and exhalation processes.

Diaphragm: الحجاب الحاجز A large muscle that directs inhalation and exhalation processes. هي عضلة تساعد على عمليتي الشهيق والزفير.

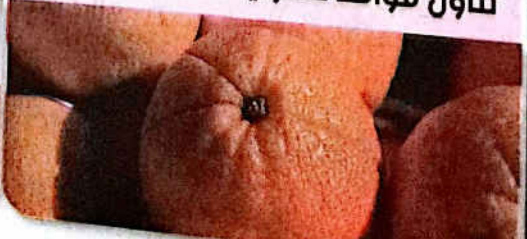
P.O.C	In inhalation عملية الشهيق	In exhalation عملية الزفير
Diaphragm	Contracts (Moves downward)	Relaxes - expands (Moves upward)
Chest size	Increases	Decreases
Type of Air	Air rich in oxygen gas enter the two lungs.	Air rich in carbon dioxide gas is expelled out the two lungs.
Figure	 يتمدد الحجاب الحاجز (يتحرك لأسفل) ويتسع القفص الصدري لإدخال الأكسجين للرئتين.	 ينكمش الحجاب الحاجز (يتحرك لأعلى) ويضيق القفص الصدري لإخراج ثاني أكسيد الكربون من الرئتين.

To keep your respiratory system healthy:

Avoid smoking.
تجنب التدخين.



Eat fruits rich in vitamin C.
تناول فواكه تحتوي على فيتامين C.



Breathe in clean ai
تنفس هواء نقي.





1 Choose the correct answer:

1. Any system inside the human's body consists of a group of .... that work together.
   a. cells b. tissues c. organs d. leaves
2. .... system(s) is (are) responsible for getting energy from food.
   a. Digestive b. Respiratory
   c. Nervous d. Digestive and respiratory
3. The food must be digested to ....
   a. get the nutrients from it b. get the needed energy
   c. do all functions inside the body d. all the previous
4. Digestion of food begins in the ....
   a. mouth b. small intestine
   c. pharynx d. large intestine
5. The process of breaking down food and changing it to chemical substances that the body absorbs to get energy is called ".................".
   a. respiration b. thinking c. digestion d. excretion
6. All these organs exist in the digestive system, except the ....
   a. esophagus b. trachea c. pharynx d. liver
7. The human mouth contains all the following, except the ....
   a. throat b. saliva c. tongue d. teeth
8. Teeth are responsible for .... food.
   a. crushing b. swallowing c. mixing d. sweeting
9. The .... facilitates swallowing food.
   a. teeth b. saliva c. tongue d. esophagus
10. The .... is a muscular organ, while the .... is a long muscular tube.
    a. stomach - pharynx b. esophagus - stomach
    c. stomach - esophagus d. pharynx - stomach

11. Food is mixed with stomach acids and digestive juices to get ....
a. hormones
b. enzymes
c. saliva
d. a soupy liquid

12. The .... allows food to pass from the pharynx to the stomach.
a. trachea
b. esophagus
c. liver
d. tongue

13. The length of the small intestine is more than .... meters.
a. 2
b. 4
c. 6
d. 8

14. The large intestine absorbs .... from wastes.
a. fats
b. water
c. starch
d. proteins

15. The .... secrete(s) juice in the small intestine to help in breaking down food into nutrients.
a. pancreas
b. liver
c. saliva
d. a & b

16. To keep your digestive system healthy, you must do all the following, except ....
a. practicing sports regularly
b. not eating many fast meals
c. not drinking a large amount of water
d. chewing the food well

17. During playing football, your breath ....
a. slows down
b. quickens
c. remains constant
d. stops

18. Which organ exists in both the digestive system and the respiratory system?
a. Esophagus
b. Trachea
c. Pharynx
d. Lungs

19. Respiration means .... oxygen gas.
a. getting rid of
b. supplying the body with
c. producing
d. expelling

20. During inhalation, the air in the throat reaches the two lungs through the ....
a. esophagus
b. pharynx
c. diaphragm
d. trachea

21. The two bronchi in the lungs are divided into smaller tubes called ....
a. bronchioles
b. alveoli
c. trachea
d. blood vessels

22. Alveoli are responsible for ....
a. carrying oxygen to all body parts
b. extracting oxygen from air
c. controlling the inhalation process
d. slowing down your breathing

23. The correct passage of air during respiration is ....
   a. nose - trachea - pharynx - lungs
   b. nose - lungs - pharynx - trachea
   c. nose - pharynx - lungs - trachea
   d. nose - pharynx - trachea - lungs
24. During inhalation, the diaphragm .... and the chest size ....
   a. contracts - decreases b. relaxes - increases
   c. contracts - increases d. relaxes - decreases
25. The .... plays an important role in inhalation and exhalation processes.
   a. esophagus b. alveoli c. stomach d. diaphragm

2 Put (✓) or (✗):

1. Each organ inside the human body consists of a group of systems. (   )
2. Digestion of food begins in the mouth. (   )
3. The liver facilitates swallowing food. (   )
4. Teeth help in breaking and crushing food into small parts. (   )
5. The stomach is a long muscular tube that secretes juices. (   )
6. Food stays in the stomach for a few minutes only. (   )
7. The blood carries nutrients to all body parts. (   )
8. All digestion of food takes place inside the stomach. (   )
9. Enzymes help in converting food to a soupy liquid. (   )
10. The undigested food is stored in the small intestine to get rid of it. (   )
11. The anus is considered the end of the digestion process. (   )
12. To keep your digestive system healthy, you must chew food well. (   )
13. During running, your breath rate slows down. (   )
14. The blood carries oxygen gas to all body parts. (   )
15. Bronchioles extract oxygen from the air. (   )
16. During inhalation, the diaphragm relaxes upward. (   )
17. Carbon dioxide gas is expelled out the body during exhalation. (   )

18. Avoiding smoking harms the respiratory system. (   )
19. Eating fruits rich in vitamin D keeps the respiratory system healthy. (   )

3 Write the scientific term:

1. The system that breaks food into small parts to get energy. (..........)
2. The digestion of food begins in it. (..........)
3. It facilitates swallowing food. (..........)
4. It is a muscular organ that stores food for a few hours. (..........)
5. It is a long muscular tube that moves the food into the stomach. (..........)
6. It absorbs water from the wastes to become solid wastes. (..........)
7. A long winding tube with a length of more than 6 meters. (..........)
8. It carries nutrients to all body parts. (..........)
9. It completes digestion of food and absorbs nutrients. (..........)
10. A process by which the air carrying oxygen gas goes into the body. (..........)
11. They extract oxygen from the air inside the two lungs. (..........)
12. They carry oxygen gas to all body parts to do their functions. (..........)
13. A large muscle that directs inhalation and exhalation processes. (..........)
14. A process in which the chest size decreases and the diaphragm moves upward. (..........)

4 Cross out the odd word:

1. Pharynx - Stomach - Liver - Trachea (..........)
2. Pharynx - Lungs - Liver - Trachea (..........)
3. Throat - Teeth - Saliva - Tongue (..........)
4. Diaphragm contracts - Chest size decreases - Inhalation (..........)

5 Classify these organs according to the systems they belong to:

Pharynx - Diaphragm - Stomach - Liver - Trachea - Anus
Nose - Tongue - Lungs - Liver - Alveoli - Small intestine

6 Complete the following sentences:

1. Each system in the human body performs a ....
2. Each system consists of a group of .... that work together.
3. .... and .... systems work together to get energy from food and breathing.
4. The .... system is necessary to get nutrients from the food.
5. The digestive system starts with the .... and ends with the ....
6. .... is a process of breaking down food.
7. .... and .... crush and break food during chewing.
8. The .... moves food from the pharynx to the stomach.
9. The .... is a muscular organ, while the .... is a muscular tube.
10. Inside the stomach, food is mixed with .... and .... to get ....
11. Food stays in the stomach for a few .... only, then it moves to .... by the muscles of the stomach.
12. .... and .... secrete juices in the small intestine to help in breaking down food into ....
13. .... carries nutrients to all body parts.
14. The large intestine absorbs .... from wastes to become .... that comes out through the ....
15. Your breath rate slows down during ...., while it .... during running.
16. The respiratory system supplies the body with .... gas and gets rid of ....
17. Inside the lung, the .... is branched into two bronchi that are divided into smaller tubes called ....
18. The .... plays an important role in extracting oxygen gas from the air.
19. The .... plays an important role in carrying oxygen gas to all body parts.

20. Respiration process includes .... and .... processes.
21. During inhalation, the diaphragm .... for .... gas to enter the lungs, while the chest size ....
22. During exhalation, the diaphragm .... to expel .... gas out, while the chest size ....
23. To keep the .... system healthy, we must avoid smoking and breathe in clean air.
24. Eating fruits rich in .... helps the respiratory system to be healthy.

7 Compare between the following:

1.

P. O. C.	Digestive System	Respiratory System
Function	....	....
Organs	....	....

2.

P. O. C.	Stomach	Lungs
System	....	....
Function	....	....

3.

P. O. C.	Inhalation	Exhalation
Diaphragm	....	....
Chest Size	....	....
Air Rich in	....	....

8 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Esophagus	a. facilitates swallowing food.
2 Teeth	b. completes the digestion of food and absorbs nutrients.
3 Saliva	c. is a muscular organ.
4 Small intestine	d. moves the food down into the stomach.
5 Large intestine	e. starts from the end of the small intestine and ends with the anus.
6 Stomach	f. break and crush food during chewing.

1 .... 2 .... 3 .... 4 .... 5 .... 6 ....

B

Column (A)	Column (B)
1 Nose	a. extract oxygen gas from the air.
2 Lungs	b. carries oxygen gas to all body parts.
3 Blood	c. Air enters the body through it.
4 Alveoli	d. are like two balloons.

1 .... 2 .... 3 .... 4 ....

9 Label the following figures:

Figure (A):

1 ....

2 ....

3 ....

4 ....

5 ....

6 ....

7 ....

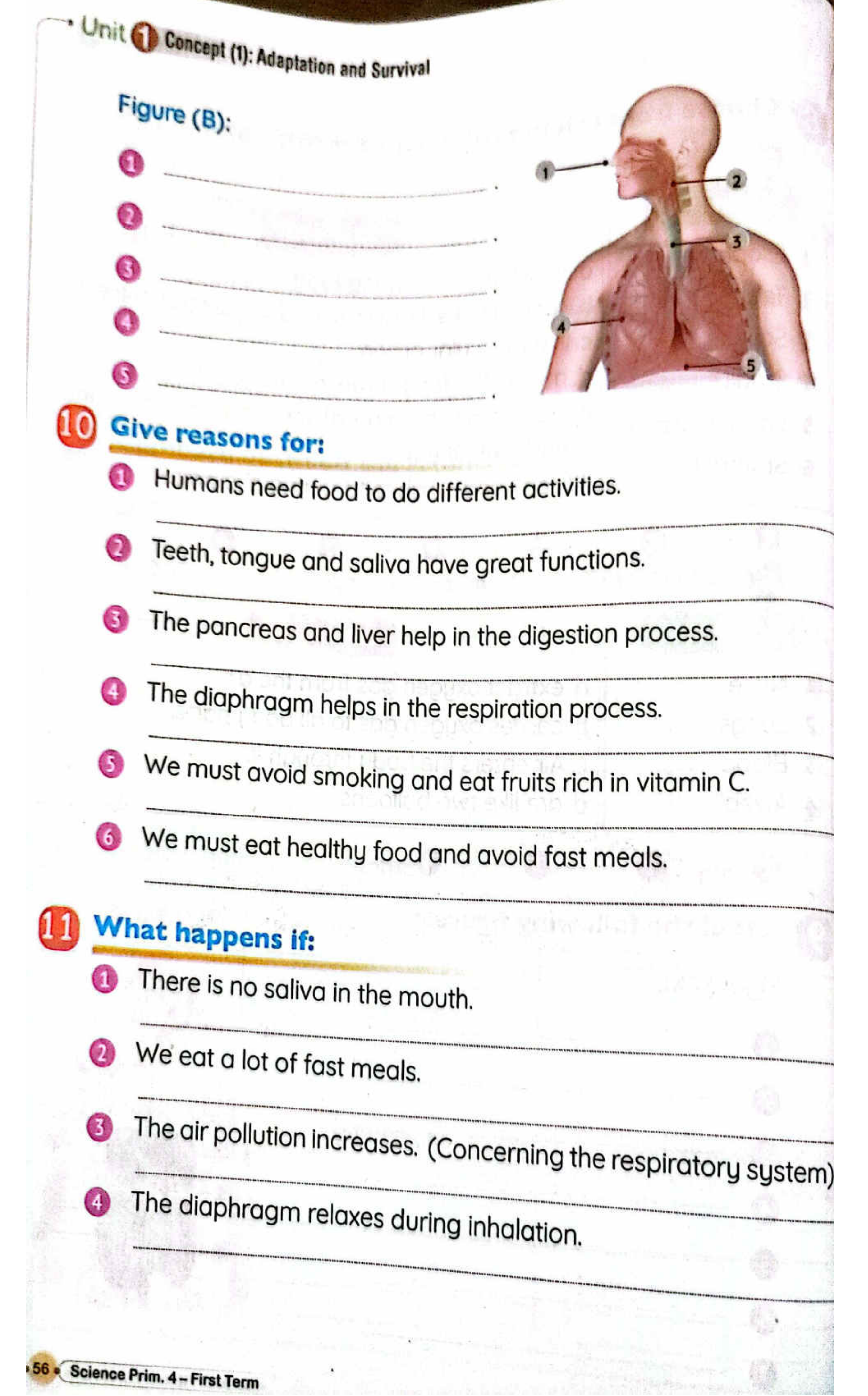


Figure (B):

1. ....
2. ....
3. ....
4. ....
5. ....

10 Give reasons for:

1. Humans need food to do different activities.
   ....
2. Teeth, tongue and saliva have great functions.
   ....
3. The pancreas and liver help in the digestion process.
   ....
4. The diaphragm helps in the respiration process.
   ....
5. We must avoid smoking and eat fruits rich in vitamin C.
   ....
6. We must eat healthy food and avoid fast meals.
   ....

11 What happens if:

1. There is no saliva in the mouth.
   ....
2. We eat a lot of fast meals.
   ....
3. The air pollution increases. (Concerning the respiratory system)
   ....
4. The diaphragm relaxes during inhalation.
   ....

Lesson 5

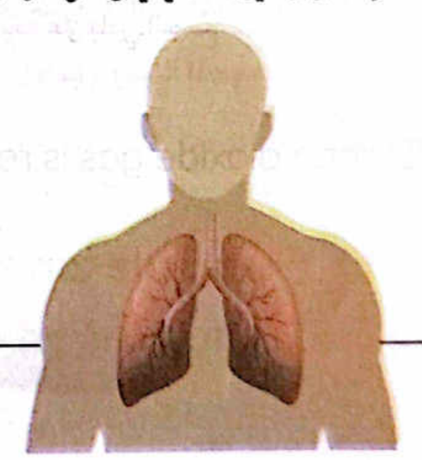
Activity 12 How Fish Breathe

- How long are you able to hold your breath underwater?
- Do you think the respiratory systems of humans and fish are the same?

Differences Between Humans and Fish
أوجه الاختلاف بين الإنسان والأسماك

Fish	Humans
Fish have gills.	Humans have two lungs.
So, fish live underwater.	So, humans live on land.
تمتلك السمكة خياشيم لذلك تعيش تحت الماء.	يمتلك الإنسان رئتين لذلك يعيش على الأرض.





Similarities Between Humans and Fish
أوجه التشابه بين الإنسان والأسماك

- Both of them inhale oxygen gas and exhale carbon dioxide gas.

  كلاهما يستنشق غاز الأكسجين ويخرج ثاني أكسيد الكربون.

- Oxygen gas is carried to all body parts.

  يتم نقل غاز الأكسجين لجميع أجزاء الجسم.

Adaptation of Fish to Live Underwater
تكيف الأسماك للعيش تحت المياه

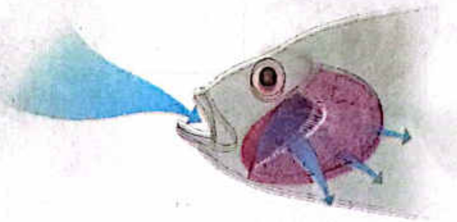
- Fish have **gills** (unique structure) to allow it to breathe underwater.
- تمتلك الأسماك خياشيم لتساعدها على التنفس تحت المياه.

- Gills are found on the sides of a fish's head and they have the ability to open and close.
- تقع الخياشيم على جانبي رأس السمكة ولها القدرة على الفتح والغلق.

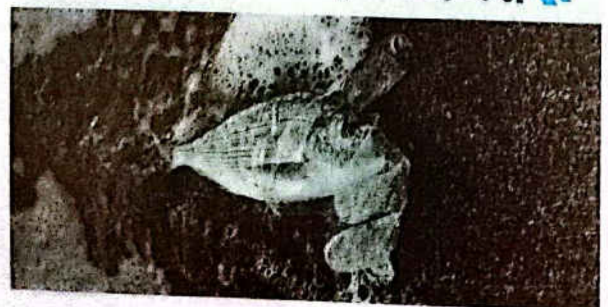
- Water enters the mouth of a fish and passes across the gills.
- تدخل المياه من فم السمكة وتمر من خلال الخياشيم.

- The blood vessels in the gills carry oxygen to the rest of the body.
- تقوم الأوعية الدموية في الخياشيم باستخلاص الأكسجين وتوزيعه على باقي الجسم.

- Carbon dioxide gas is released from the other part of the gills.
- يخرج ثاني أكسيد الكربون من الجهة الأخرى من الخياشيم.



- Water pollution affects fish health.
- يؤثر تلوث الماء على صحة الأسماك.



- Fish need clean water to survive.
- تحتاج الأسماك لمياه نظيفة للبقاء.



Activity 13 Humans Change the Enviroment

- Organisms adapt to the ecosystem in which they live, however that ecosystem may change.

تتكيف الكائنات الحية مع التي تعيش بها ومع ذلك قد تحدث بعض التغيرات البيئية.

There are two types of environmental changes

1 Natural Changes
تغيرات طبيعية

- Usually, the change caused by nature is ***slow***.
- Organisms can ***adapt*** to this change.

يكون التغير البيئي بسبب الطبيعة بطيئًا وتستطيع الكائنات الحية التكيف مع هذا التغيير.

2 Human Activities
تغيرات بسبب أنشطة الإنسان

- Usually, the change caused by human activities is ***fast***.
- Organisms cannot adapt to this change, so they ***move***, ***die*** or ***extinct***.

يكون التغير البيئي بسبب النشاط البشري سريعًا ولا تستطيع الكائنات الحية التكيف مع هذا التغيير وتحاول الهروب وقد تموت أو تنقرض.

How do living organisms survive the pollution caused by humans



- Animals ***move*** to another ecosystem.

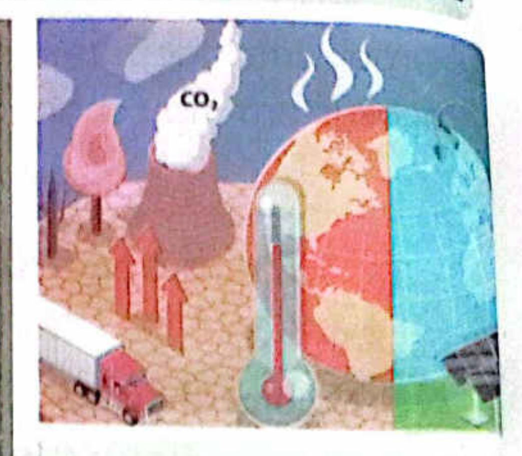
تهاجر الحيوانات لموطن آخر.

- Plants depend on their ***seeds landing*** in a better place to survive.

تعتمد النباتات على هبوط بذورها في مكان أفضل للبقاء على قيد الحياة.







1. The change in temperature.

« التغير في درجات الحرارة.





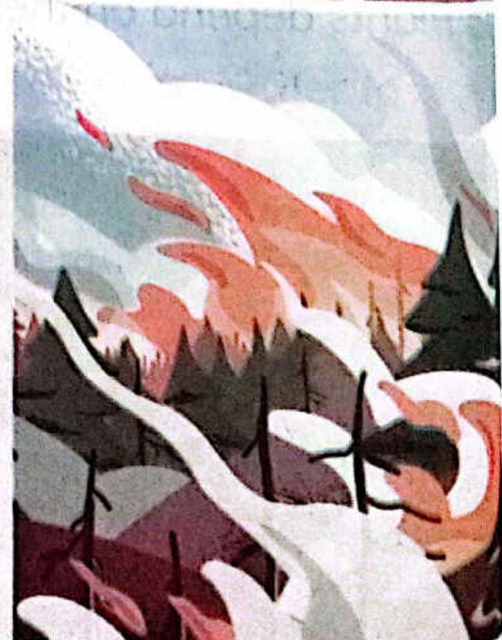
2. The amount of rainfall.

« كمية الأمطار المتساقطة.



3. Severe weather events, such as winds.

« الظروف المناخية القاسية (مثل الرياح).



4. <u>*Wildfires and floods:*</u>

They alter the plants available for food, which increases or decreases the number of predators or the prey.

« حرائق الغابات والفيضانات.

تقوم بتغيير كمية النباتات المتاحة للغذاء مما يؤدي إلى زيادة أو تقليل عدد الحيوانات المفترسة أو الفرائس.

2 Human Activities تغيرات بسبب أنشطة الإنسان



1 Cutting down trees in forests.

قطع الأشجار في الغابات.



2 Plowing grasslands.

تجريف التربة.



3 Cars exhausts and factory pollution.

عوادم السيارات والمصانع.



4 Throwing wastes in water.

إلقاء المخلفات في المياه.



5 Soil pollution.

تلوث التربة.



6 Introducing plants and animals to places that were never part of their ecosystem.

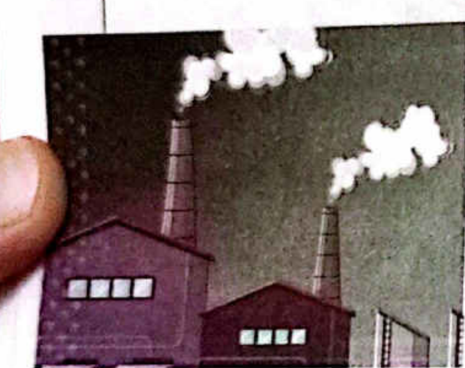
وضع حيوانات أو نباتات في بيئة مختلفة عن بيئتها الأصلية.

Human is also affected by the changes in the ecosystem:

1. **Air pollution (smog):** makes breathing hard.
2. **Water pollution:** makes finding clean drinking water hard.
3. **Soil pollution:** makes crops stop growing.

الآثار السلبية للتلوث على البيئة والإنسان:

1. تلوث الهواء: مما يؤدي لصعوبة التنفس.
2. تلوث الماء: مما يؤدي لعدم وجود مياه شرب نظيفة.
3. تلوث التربة: يؤدي لعدم نمو المحاصيل.





People living in cities are exposed to a high level of air pollution tha[t] causes:

الأشخاص الذين يعيشون بالمدن أكثر عرضة لتلوث الهواء الذي يُسبب:

lungs damage	asthma	heart problems
تدمير الرئتين	الربو	أزمات قلبية

The role of human to help restore the ecosystem:

دور الإنسان في إعادة التوازن البيئي

1. Replanting the cleared forests. — [إ]عادة زراعة الغابات التي أزيلت.
2. Removing air and water pollutants. — [ا]لتخلص من ملوثات الماء والهواء.
3. Keeping plants and animals in their ecosystems — [إب]قاء الكائنات الحية في مواطنها.

Activity 14 Optional Activity
Penguin Feet







1 Choose the correct answer:

1. Unlike humans, fish do not breathe underwater using the ....
   a. skin b. gills c. lungs d. paddles
2. Fish have .... to breathe underwater.
   a. skin b. gills c. lungs d. paddles
3. As fish need clear water to breathe, humans need .... to drink.
   a. clear air b. polluted air
   c. clear water d. polluted water
4. Both of humans and fish .... to survive.
   a. need clear water to breathe b. need oxygen gas and food
   c. inhale carbon dioxide d. exhale oxygen gas
5. Both of lungs in humans and gills in fish ....
   a. extract oxygen from water b. expel carbon dioxide to air
   c. can survive underwater
   d. are considered structural adaptations
6. Gills are found on both sides of the fish ....
   a. tail b. eye c. head d. paddles
7. Gills have the ability to ....
   a. open and close in water b. extract oxygen from the air
   c. extract carbon dioxide from the air d. expel oxygen gas to the water
8. The .... in gills carry oxygen to the rest of the body of a fish.
   a. blood b. blood vessels c. tissues d. cells
9. .... have .... to inhale oxygen underwater.
   a. Humans - gills b. Fish - gills
   c. Humans - lungs d. Fish - lungs
10. Fish need .... to survive underwater.
    a. strong paddles b. long tails
    c. clean water d. flexible body

11. Usually, the change caused to the environment by nature is .... that caused by human activities.
    a. slower than b. faster than c. stronger than d. equal to
12. If living organisms cannot adapt with the changes that occurred to their ecosystems, they may ....
    a. die or extinct b. survive
    c. move to another ecosystem d. a & c
13. Living organisms cannot adapt to the changes caused by human activities, such as ....
    a. floods b. wildfires
    c. cutting trees d. weather events
14. Humans can help in restoring the ecosystem by ....
    a. plowing grassland b. replanting the removed forests
    c. cutting down trees d. throwing wastes in the water
15. During wildfires, animals can survive by ....
    a. staying in their burrows b. undergoing camouflage
    c. moving to another ecosystem d. climbing trees
16. Which living organism can survive from the following examples?
    a. A penguin introduced to live in the desert.
    b. Fish swimming in a polluted lake.
    c. Arctic fox is exposed to cold weather.
    d. Plants are irrigated with polluted water.
17. Increasing the air pollutants impacts people through ....
    a. lung damage b. heart problems
    c. asthma d. all the previous
18. .... pollution prevents crops from growing.
    a. Air b. Water c. Soil d. Noise
19. All of these are changes done by nature itself to the ecosystem except ....
    a. floods b. wildfires
    c. cars exhausts d. weath...

20. Environmental pollution is one of the serious problems that impacts ....
a. humans only
b. plants only
c. animals only
d. all the previous

2 Write the scientific term:

1. A structure that helps humans to breathe clean air. (............)
2. A unique structure that helps fish to extract oxygen from water. (............)
3. They carry oxygen gas to all body parts of a fish. (............)
4. The gas that humans and fish need to survive. (............)
5. The gas released from the gills of a fish. (............)
6. Environmental changes that are usually slow and animals adapt to them. (............)
7. Environmental changes that are usually fast and animals cannot adapt to them. (............)
8. A human activity that harms the wildlife in forests. (............)
9. A kind of pollution that causes asthma and lungs damage. (............)
10. A kind of pollution that makes the crops die. (............)

3 Put (✓) or (✗):

1. Both humans and fish need clean water to survive. (   )
2. Fish have gills to expel oxygen underwater. (   )
3. Fish will die if the water is polluted by human activities. (   )
4. Blood vessels carry oxygen gas to all body parts. (   )
5. The changes done to the ecosystem by nature itself are usually fast. (   )
6. Organisms may adapt to the changes caused by human activities. (   )

7. Plants depend on seeds to be planted in a better place to survive and grow. ( )
8. Wildfires and floods are from the human activities that impact the ecosystem. ( )
9. Plowing grassland affects the lives of plants and animals. ( )
10. Soil pollution makes it hard to find clean drinking water for humans. ( )
11. Water pollution affects the health of humans, fish and plants. ( )
12. Air pollution prevents the crops from growing. ( )
13. People living in cities are exposed to a high level of air pollution. ( )
14. Humans can help the ecosystem by reducing air and water pollution. ( )

4 Cross out the odd word:

1. Gills – Fish – Inhale oxygen – On land (..........)
2. Gills – Humans – Lungs (..........)
3. Wildfires – Plowing grasslands – Floods (..........)
4. Cutting down forests – Wildfires – Rainfall (..........)
5. Lungs damage – Asthma – Dying crops (..........)

5 Classify these environmental changes in the following table

Blowing grassland - Floods - Weather events - Cutting down forests - Amount of rainfall - Car exhausts - Wind - Factory pollutants

Natural Changes	Human Activities
....	....
....	....
....	....
....	....

6 Compare between the following:

P. O. C.	Fish	Humans
Habitat (Ecosystem)	....	....
Structural Adaptation Helping in Breathing	....	....
Inhaled Gas	....	....
Exhaled Gas	....	....

7 Complete the following sentences:

1. Fish have .... to breathe underwater, while .... have lungs to extract .... gas from ....
2. The gills in a fish are considered .... adaptation.
3. Both humans and fish need clear .... to survive.
4. .... can survive on land, while .... can survive underwater.
5. In fish, ... carry oxygen gas to all body parts.
6. Gills are found on the sides of a fish's .... and they have the ability to .... or ....
7. .... pollution impacts the fish health.
8. Environmental changes caused by .... are fast, so organisms can't adapt to them and they ...., ... or ....
9. Plants depend on .... to be planted in a better place to survive and grow.
10. .... pollution makes the crops die.
11. Increasing the air pollutants impacts people through ....
12. Humans can replant .... to restore the ecosystem.

8 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Lungs	a. is carried by blood vessels to all body parts.
2 Gills	b. are slow and organisms can adapt to them.
3 Blood vessels	c. are usually fast and animals can't adapt to them.
4 Oxygen gas	d. carry oxygen to all body parts.
5 Carbon dioxide gas	e. is exhaled by humans and animals.
6 Natural changes	f. allow humans to extract oxygen from the air.
7 Human activities	g. allow fish to survive underwater.

1 .... 2 .... 3 .... 4 ....
5 .... 6 .... 7 ....

B

Column (A)	Column (B)
1 Air pollution	a. makes the crops die.
2 Water pollution	b. causes asthma and heart problems.
3 Soil pollution	c. affects the health of all living organisms.

1 .... 2 .... 3 ....

9 What is the importance of:

1. Gills in fish: ....
2. Lungs in humans: ....
3. Oxygen gas: ....
4. Blood vessels: ....

10 Mention three ways for humans to restore the ecosystem:

1. ....
2. ....
3. ....

11 Study the following figures, then answer the questions:



1. Scientists conducted a unique experiment to transport a penguin from Antarctica to the desert.
   Do you think that penguins can adapt to the desert? Explain your answer.
   ....

2. Humans negatively impact their surroundings by a lot of activities.

			
Figure (1)	Figure (2)	Figure (3)	Figure (4)

a. Label the figures

1. .... 2. .... 3. .... 4. ....

b. Which figure does not represent a human activity?

....

c. Which figure represents a fast change to the ecosystem?

....

12 Give reasons for:

1. Humans have lungs, while fish have gills.
   ....
2. Human activities are more dangerous to the environment than natural changes. ....
3. People live in cities are exposed to a high level of pollution.
   ....

13 What happens if:

1. Humans have gills like fish. ....
2. Humans bad activities increase. ....

Lesson 6

Activity 15 Analyze Like a Scientist

- Scientists can learn how organisms adapt to the environment through research.

« يمكن للعلماء أن يعرفوا كيف تتكيف الكائنات الحية مع البيئة من خلال البحث.

- Scientists use this knowledge to help endangered species to survive.

« يستخدم العلماء هذه المعرفة لمساعدة الأنواع المهددة بالانقراض على البقاء على قيد الحياة.



Amphibians البرمائيات

- They are small animals, such as:

Frogs



Toads



Salamanders



- They can live in moist environments (rainforests - streams - ponds)

تعيش في البيئات الرطبة (الغابات المطرة - مجرى المياه - البرك) .





Respiration in Amphibians التنفس في البرمائيات

On Land	In Water
» They can breathe through their lungs (like humans). « تستطيع التنفس من خلال الرئتين كالإنسان.	» They can also extract oxygen from water using their skin. (Structural Adaptation) « تستطيع استخلاص الأكسجين من المياه عن طريق الجلد (تكيف تركيبي).





» Amphibians are covered with skin that water and gases can pass through.

« البرمائيات مغطاة بالجلد الذي يمكن أن يمر من خلاله الماء والغازات.

» Amphibians need clean water to stay healthy.

« تحتاج البرمائيات إلى مياه نظيفة لتظل بصحة جيدة.

» Amphibians are very sensitive to any environmental pollution.

« البرمائيات حساسة للغاية لأي تلوث بيئي.

90 species	124 species
» They became extinct in the last 20 years. « يوجد ٩٠ فصيلة انقرضت آخر ٢٠ عامًا.	» They are endangered. « يوجد ١٢٤ فصيلة معرضة للانقراض.

Factors that cause extinction of amphibians
عوامل تؤدي لانقراض البرمائيات

1. Water and air pollution. تلوث الماء والهواء.
2. Destroying natural habitats. تدمير المواطن الطبيعية.
3. Viruses in water. الفيروسات في المياه.

Protecting amphibians from extinction
حماية البرمائيات من الانقراض

1. Avoid throwing wastes materials in water. تجنب إلقاء المخلفات في المياه.
2. Getting rid of of chemicals in a correct way to avoid water pollution.
التخلص من الكيماويات بطريقة صحيحة لتجنب تلوث المياه.

The Role of Scientists to Protect Amphibians from Extinction
دور العلماء لحماية البرمائيات من الانقراض

Golden frogs are from the endangered species.

So, scientists are researching to save them from extinction by studying:

1. How do these animals interact with the environment?
2. What makes these animals sick in their environment?
3. The reason of them disappearing all over the world.



يعتبر الضفدع الذهبي من الفصائل المعرضة للانقراض

ويبحث العلماء عن كيفية حماية هذا النوع من الانقراض بمعرفة:

١. كيف تتفاعل هذه الحيوانات مع البيئة؟

٢. ما الذي يجعل هذه الحيوانات تصاب بالمرض في بيئتها؟

٣. سبب اختفائها في جميع أنحاء العالم.

Activity 16 Optional Activity
Review: Adaptation and Survival





1 Choose the correct answer:

1. Amphibians are small animals that can live in ....
   a. rainforests b. ponds
   c. streams d. all the previous
2. Both of .... and .... can survive on land.
   a. fish - humans b. frogs - fish
   c. humans - toads d. penguins - dolphins
3. .... species are organisms whose numbers have reduced.
   a. Extinct b. Endangered
   c. Survived d. Dead
4. Salamanders may live in ....
   a. deserts b. snow c. rainforests d. cities
5. When a toad extracts oxygen from water using its skin, we consider this an example of .... adaptation.
   a. structural b. functional
   c. behavioral d. no correct answer
6. Amphibians, fish and humans ....
   a. extract oxygen from water b. can respire through the lungs
   c. can respire through the skin d. inhale oxygen gas
7. Which statement of the following is wrong?
   a. Fish can survive underwater.
   b. Amphibians survive in water only.
   c. Humans can survive on land only.
   d. Fish, amphibians and humans need clean water.
8. The species that disappear due to environmental pollution are called ....
   a. endangered species b. dangerous species
   c. strong species d. extinct species

9. The species that frogs and toads belong to is called ....
   a. reptiles   b. birds   c. amphibians   d. mammals
10. To decrease the number of endangered species of frogs, we must ....
    a. throw wastes in water and air
    b. transfer frogs to the desert
    c. get rid of chemicals in a correct way
    d. destroy its natural habitats

2 Write the scientific term:

1. Small animals that live in moist environments. (............)
2. The gas needed for respiration for animals, humans and fish. (............)
3. The organ that allows frogs to breathe underwater. (............)
4. The organ that allows frogs to breathe on land. (............)
5. They are trying to save golden frogs from extinction. (............)
6. The kind of adaptation of amphibians breathing through their skin on the land. (............)
7. The habitat that includes amphibians. (............)

3 Put (✓) or (✗):

1. Humans, frogs and fish need clean water to survive. (   )
2. Frogs and toads are considered from reptiles that live in rainforests. (   )
3. Both of amphibians and humans can survive out of the water. (   )
4. The skin of a frog is always dry and it adapts to live out of the water. (   )

5. Scientists are researching for the reason why the golden frog is disappearing all over the world. ( )
6. We must dispose chemicals in a correct way to avoid water pollution. ( )
7. The number of amphibians increase by the increasing pollution. ( )
8. Amphibians are very sensitive to any environmental pollution. ( )

4 Complete the following sentences:

1. ...., ... and .... are considered from amphibians that live in ....
2. .... and .... can survive on land only.
3. A frog extracts .... gas from air by its ....
4. Amphibians are covered with .... that water and gases can pass through.
5. Disposal of chemicals in a correct way makes us avoid ....
6. The ability of frogs to extract oxygen gas through their skin is considered .... adaptation.
7. As pollution increases, the number of endangered species ....
8. The golden frog is from the .... species.
9. Fish use .... to breathe, while toads use .... to breathe.
10. .... season is very dangerous for frogs.

5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Amphibians	a. can survive on land only.
2 Fish	b. can survive underwater and air.
3 Humans	c. extract carbon dioxide.
	d. can survive underwater only.

1 .... 2 .... 3 ....

6 Give reasons for:

1. Scientists learn a lot about how animals adapt.

....

....

2. Amphibians can live on land or underwater.

....

....

3. The golden frog is one of the endangered species.

....

....

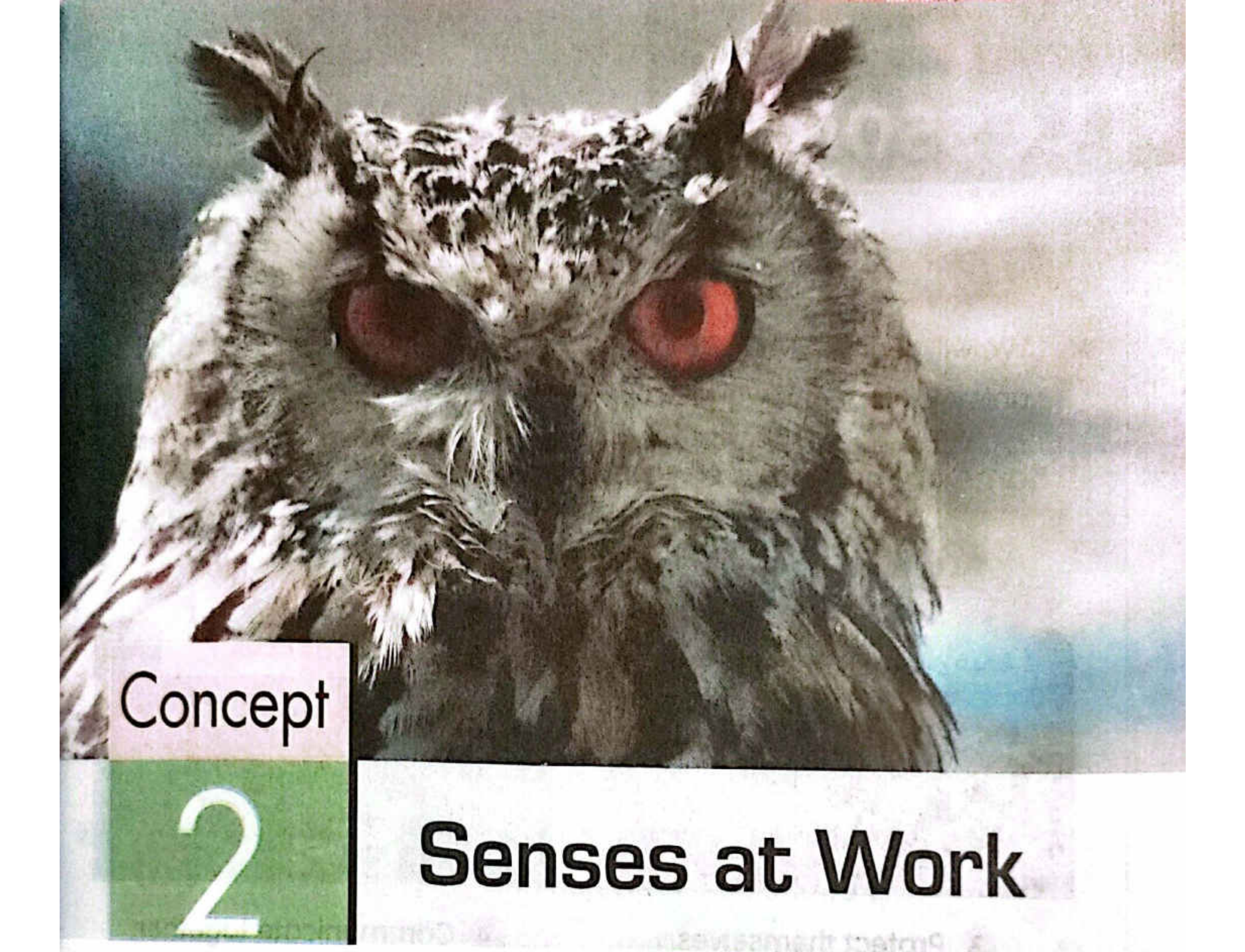
7 What happens if:

- Increasing the water pollution.

....

....

....



Concept 2

Senses at Work

In this concept, we are going to study:

- Dolphin super senses.
- Super sensory organs in some animals.
- Nocturnal animals.
- The nervous system and how does it work?

Key Vocabulary

- Brain
- Reflex
- Senses
- Information
- Nerve
- Sound
- Receptor

Lesson 1

Activity 1 Can You Explain?

» We will connect what we have learned about adaptations to how animals sense the world around them.

Some animals have sharper senses than humans to:

1. Adapt to the environment.

التكيف مع البيئة التي تعيش فيها.



2. Search for food.

البحث عن الغذاء



3. Protect themselves.

حماية أنفسها من الخطر



4. Communicate together.

التواصل معًا



Egyptian Mongoose النمس المصري

- Egyptian mongoose communicates with others by producing sounds that seem as chatters.

يتواصل حيوان النمس مع الآخرين بأصوات تشبه الثرثرة.

- These sounds tell the others to move to another place to search for food.

تسمح هذه الأصوات بنقل رسائل لحيوانات النمس الأخرى للتحرك والبحث عن الغذاء.



Activity 2 Dolphin Super Senses

» To survive, dolphins must be able to find food and protect themselves in the dark waters.

« كي تتمكن الدلافين من البقاء.. يجب أن تكون قادرة على إيجاد الطعام وحماية أنفسها في المياه المظلمة.

Dolphins Super Senses حواس الدلافين الخارقة



» **Dolphins** use a property known as **"echolocation"** that depends on "echo" to locate their prey and objects in the dark water.

« يستخدم الدولفين خاصية تحديد الموقع بالصدى التي تعتمد على صدى الصوت لتحديد مواقع الفرائس في المياه.

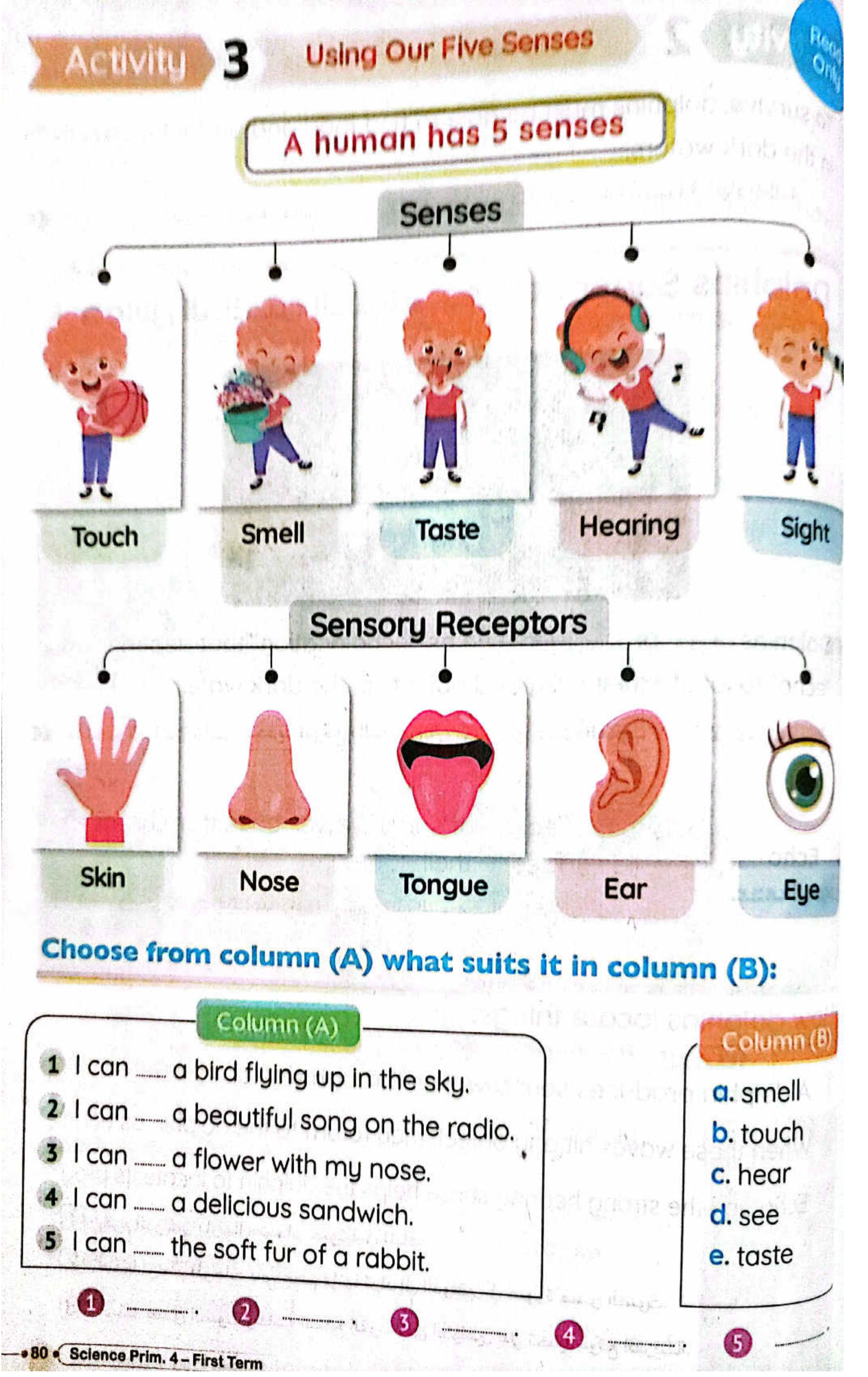
Echo صدى الصوت: It is the reflection of sound waves back from hitting a solid surface to their source.

هو ارتداد موجات الصوت عند اصطدامها بجسم صلب إلى مصدر الصوت (الدولفين).

How dolphins locate things:

1. A dolphin produces sound waves through water.
2. When these waves hit any object, they return to the dolphin as echo.
3. Echo and the strong hearing sense helps the dolphin to locate its prey.

1. يقوم الدولفين بإرسال موجات صوتية في المياه.
2. عندما ترتطم الموجات بأي جسم فإنها ترتد إلى الدولفين في صورة صدى الصوت.
3. يساعد صدى الصوت وحاسة السمع القوية لدى الدولفين على تحديد موقع الفريسة.



Activity 3 Using Our Five Senses

A human has 5 senses

Senses

Touch | Smell | Taste | Hearing | Sight

Sensory Receptors

Skin | Nose | Tongue | Ear | Eye

Choose from column (A) what suits it in column (B):

Column (A)

1. I can .... a bird flying up in the sky.
2. I can .... a beautiful song on the radio.
3. I can .... a flower with my nose.
4. I can .... a delicious sandwich.
5. I can .... the soft fur of a rabbit.

Column (B)

a. smell
b. touch
c. hear
d. see
e. taste

1 .... 2 .... 3 .... 4 .... 5 ....

Activity 4 What Do You Already Know About Senses at Work?

» Some animals have one or more senses sharper than humans to adapt to their habitats.

« بعض الحيوانات لها بعض الحواس أقوى من الإنسان لتساعدها على التكيف في بيئتها.

Examples for Animal Sharp Senses: أمثلة لبعض حواس الحيوانات الخارقة:

Animal		Sense الحاسة	Purpose الغرض منها
1 Owl		Hearing & Sight (Extra senses)	To find its prey in the dark. للبحث عن فريستها في الظلام.
2 Fox		Hearing & Sight (Extra senses)	To locate its prey. To avoid danger. للبحث عن الفرائس. لتجنب الخطر.
3 Chameleon		Sight & Taste	To search, hunt and taste insects. للبحث عن الغذاء وتذوقه.
4 Dog		Hearing, Smell and Sight	To recognize friends. للتعرف على الأصدقاء.
5 Monkey		All senses	To identify things. لاكتشاف الأشياء.

Exercises

1 Choose the correct answer:

1. Animals in forests use their sharp senses to do all the following except ....
   a. escaping from danger
   b. escaping from the prey
   c. communicating together
   d. searching for food
2. .... communicate together by producing a sound like a chatter.
   a. Bull sharks
   b. Polar pears
   c. Penguins
   d. Egyptian mongooses
3. Dolphins use a property known as .... to survive.
   a. countershading
   b. camouflage
   c. echolocation
   d. migration
4. When sound waves produced by a dolphin hits a mackerel fish the sound will ....
   a. become louder
   b. bounce back to the dolphin
   c. bounce away from the dolphin
   d. disappear
5. An owl uses its strong senses of .... and .... to locate its prey in the dark.
   a. sight - taste
   b. hearing - sight
   c. smell - hearing
   d. taste - hearing

2 Write the scientific term:

1. It is the reflection of sound waves back from the solid surface to its source. (............)
2. A property that helps dolphins locate their prey in the dark waters. (............)

3 Put (✓) or (✗):

1. Dolphins use their sharp sense of hearing to locate their prey in the dark water. ( )

2. When the sound waves hit a solid object, the sound becomes stronger. (   )
3. To hunt, dolphins use countershading, while bull sharks use echolocation. (   )
4. Most animals have a weaker sense of hearing than humans. (   )

4 Complete the following sentences:

1. Egyptian mongooses communicate together by producing ______ that seem to us as ______ .
2. A dolphin uses a property called ______ to locate its prey underwater, as it has a sharp sense of ______ .
3. Echo is the reflection of ______ when it hits ______ .
4. We use our ______ sense to differentiate between hot and cold cups of water.
5. Foxes use their sharp senses of ______ and ______ to avoid danger.
6. Dogs use their sharp senses of ______ and ______ to recognize friends.

5 Classify the following animals according to the hunting strategy:

Dolphin – Fennec fox – Chameleon – Bull shark – Bat

Hunting Strategy	Countershading	Echolocation	Camouflage
Animal	______	______	______

6 Give reasons for:

1. Egyptian mongooses make sounds as chatters.

____

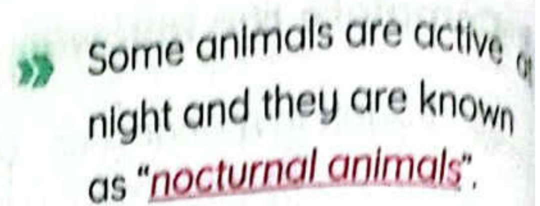
2. Dolphins can find food in dark water.

____

Lesson 2



Activity 5 Super Senses



» Some animals are active at night and they are known as "nocturnal animals".

» بعض الحيوانات تنشط أثناء الليل وتسمى الحيوانات الليلية.

» Imagine if you had to find something moving in the darkness, your ear will detect noise, but it would be hard to see it well.

« تخيل إنك تبحث عن شيء يتحرك في غرفة مُظلمة قد تسمع صوت ضوضاء ولكن من الصعب رؤية الجسم بوضوح.





Why do some animals hunt at night?



1. The animal may live in a hot region, so it prefers to look for food at night when the weather becomes cool.
2. Some prey is available at night only.
3. Some animals depend on the complete darkness to hide and surprise their prey.

1. قد يعيش الحيوان في منطقة حارة، لذلك يفضل البحث عن الطعام ليلًا عندما يصبح الجو باردًا.
2. تتوفر بعض الفرائس في الليل فقط.
3. تعتمد بعض الحيوانات على الظلام الدامس للتخفي ومفاجأة الفريسة.

Super Sensory Adaptation

It allows some animals to search for food in the dark.

يسمح التكيف الحسي الفائق لهذه الحيوانات بالتنقل في الظلام والعثور على الطعام.

Nocturnal Animals الحيوانات الليلية

Nocturnal Animal الحيوان الليلي	Super Sensory Adaptation تكيف الأعضاء الحسية	Reason السبب
1 Snakes (Reptiles) 	• Snakes can't see in the dark. • They have the ability to sense the heat of the prey by a special part in their face. لها القدرة على استشعار الحرارة عن طريق جزء في وجهها.	To locate their prey by sensing its heat. لتحديد موقع الفريسة.
2 Bats 	• Bats can't see in the dark. • They use echolocation and their strong hearing sense. تستخدم صدى الصوت وحاسة السمع القوية.	To locate their prey (insects). لتحديد موقع الفريسة (الحشرات).
3 Owls 	They have extraordinary sight and hearing senses. تمتلك حاستي بصر وسمع حادتين.	To locate their prey. لتحديد موقع الفريسة.
	They can rotate their heads in all directions. تستطيع أن تدير وجهها في جميع الاتجاهات.	To search for their prey everywhere. للبحث عن الطعام في جميع الاتجاهات.
	They have bowl-shaped faces and feathers in their heads. تمتلك وجهًا يشبه الوعاء.	To detect distant sounds and quiet movements. لتحديد الحركات الضئيلة والبعيدة.

Activity 6 The Nervous System

Nervous System

- The five sensory organs (eyes, nose, ears, tongue and skin) are one of the important parts of the nervous system.
  تعتبر أعضاء الحواس الخمسة مثل العين والأنف والأذن واللسان والجلد جزءًا هامًا من الجهاز العصبي.
- Mammals as humans, elephants, and dogs have the same nervous system.
  تمتلك الثدييات مثل الإنسان والفيل والكلب نفس تركيب الجهاز العصبي.
- The nervous system consists of:
  يتكون الجهاز العصبي من:

Brain المخ	Spinal Cord النخاع الشوكي	Nerves الأعصاب
		
• The main control center of the body. مركز التحكم الرئيسي في جسم الإنسان.	• It carries messages from the brain to the body and vice versa. يحمل الرسائل من المخ لأعضاء الجسم والعكس.	• They carry messages from the brain to the spinal cord and other body parts and vice versa. تحمل الرسائل والمعلومات والإشارات من المخ والنخاع الشوكي لأعضاء الجسم والعكس.

- The brain is connected to the spinal cord by nerves that pass through the backbone.
- The spinal cord branches are distributed through all body parts.
- Some nerves are connected directly to the brain, such as the nerves of the eyes and heart.

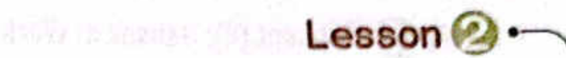
« يتصل العقل والنخاع الشوكي معًا بواسطة أعصاب تمر عبر العمود الفقري للإنسان.

« يتفرع من النخاع الشوكي أعصاب صغيرة تنتشر في جميع أنحاء الجسم.

« تتصل بعض الأعصاب مباشرة بالمخ مثل أعصاب العينين وأعصاب القلب.

Sight الرؤية
Hearing السمع
Smell الشم
Touch اللمس
Taste التذوق

Brain المخ
Spinal cord الحبل الشوكي
Peripheral nerves الأعصاب الطرفية



How do information reach your brain from the senses?

» The sensory organ receives information from the environment.

« يستقبل عضو الحس المعلومات من البيئة المحيطة بنا.

» The nerves transmit information to the brain as electrical impulses.

« تنتقل تلك المعلومات عبر الأعصاب من أعضاء الحواس الخمسة إلى العقل على شكل نبضات كهربية.

» The brain translates the information, processes it and gives a response.

« يقوم المخ بترجمة المعلومة ويستجيب بردّ فعل مناسب.



» The five sensory organs contain special nerves called "sensory receptors".

« تحتوي أعضاء الحواس الخمسة على أعصاب خاصة تسمى مستقبلات حسية.

Sensory Receptors المستقبلات الحسية	They are the nerves found in the sensory organs and they receive information from the environment. هي الأعصاب الموجودة فى أعضاء الحواس الخمسة والتي تستقبل المعلومات من البيئة المحيطة.

Example: Pizza and the Nervous System:



» When you smell a pizza, you receive this information from the sensory receptors in your nose.

» The sensory receptors found at the back of your nose send electrical impulses to the brain through your nerves.

» The brain translates the information, processes it and gives a response.

Activity 7 Optional Activity

Processing Sensory Information



1 Choose the correct answer:

1. Animals that adapted to be active at night only are known as .... animals.
   a. dark b. shadow c. night d. nocturnal
2. Both .... and .... use echo to search for food in complete darkness.
   a. snakes - owls b. owls - dolphins c. dolphins - owls d. dolphins - bats
3. Hunting at night for some animals is considered .... adaptation.
   a. behavioral b. structural c. functional d. physical
4. .... cannot see very well in the darkness at night.
   a. Humans and owls b. Snakes and bats c. Owls and bats d. Snakes and owls
5. A snake has the ability to catch rats at night because ....
   a. it has extraordinary sight and hearing senses
   b. it senses the heat of their warm bodies
   c. it hears the echo reflected from the rats
   d. it depends on camouflage
6. Owls have extraordinary .... and .... senses.
   a. sight - smell b. taste - hearing c. sight - hearing d. sight - taste
7. A snake can sense the jerboa moving at night by a special part in its ....
   a. tail b. eye c. nose d. face
8. The owl rotates its head in all directions to ....
   a. warm its body b. tear the prey's flesh c. avoid any danger d. search food everywhere
9. In the low light level, ... can see objects clearly.
   a. humans b. snakes c. owls d. bats

10. The face of an owl looks like a .... to detect any quiet movement.
    a. bowl   b. circle   c. triangle   d. rectangle

11. All of the following are the components of the nervous system, except the ....
    a. brain   b. heart   c. nerves   d. spinal cord

12. The .... carry(ies) messages from the brain to all body parts and vice versa.
    a. spinal cord   b. blood
    c. nerves   d. spinal cord and nerves

13. The .... is connected to the brain and it's located inside the backbone.
    a. heart   b. lung
    c. spinal cord   d. liver

14. The messages are transferred from the sensory organs to the brain in the form of ....
    a. electrical impulses   b. sound impulses
    c. responses   d. reflexes

15. .... is the main control center in the body of the living organism.
    a.   b.   c.   d.

16. Sensory receptors are nerves found near all the following, except the ....
    a. tongue   b. skin   c. liver   d. nose

17. The correct order of the nerve message path for the following figure is: ....
    a. Nerves → Brain → Nose
    b. Nose → Nerves → Brain
    c. Tongue → Nerves → Brain
    d. Tongue → Brain → Nerves

2 Write the scientific term:

1. A property that helps dolphins and bats locate their prey in the dark. (..........)
2. An animal that has the ability to sense the heat of the warm bodies of their prey. (..........)
3. A nocturnal bird that has a bowl-shaped face with feathers. (..........)
4. The system responsible for feeling the water if it is cold or hot. (..........)
5. The main control center in the body of an animal. (..........)
6. It passes through the backbone and it is connected to the brain. (..........)
7. The branches extended all over the body parts and they carry messages. (..........)
8. The nerves found near the sensory organs and they receive information from the surrounding environment. (..........)

3 Complete the following sentences:

1. ______ is the best time for nocturnal animals to navigate for their prey.
2. ______ helps bats and dolphins to search for food in the ______.
3. An owl can search for its prey everywhere around it by turning ______.
4. ______ in humans is like computers in processing information.
5. Some nerves are connected directly to the brain, such as ______ and ______.
6. The brain produces ______ when the information about the smell of food reaches it.

4 Put (✓) or (✗):

1. Nocturnal animals hunt at night to surprise their prey. (   )
2. Snakes can sense their prey through their sharp hearing sense. (   )
3. Bats wait for the echo produced from the prey to attack it. (   )

4. An owl can rotate its head in all directions to scare its attackers. ( )
5. The brain is considered the most important organ in our bodies. ( )
6. Both the spinal cord and nerves carry messages in one direction. ( )
7. Information is transmitted from the sensory organs to the brain in the form of electrical impulses. ( )
8. The sense of sight in owls is stronger than in bats. ( )

5 Classify the following words in the table:

Sight - Tongue - Nose - Smell - Eyes - Ears - Touch - Skin - Hear - Taste

Senses	Sensory Organs
....	....
....	....
....	....

6 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Brain	a. are transmitted from the sensory organs to the brain.
2 Spinal cord	b. are nerves found in the sensory organs and they receive information.
3 Nerves	c. is located inside the backbone.
4 Sensory receptors	d. is the main control center of the body of the living organism.
5 Electrical impulses	e. are branches distributed all over the body

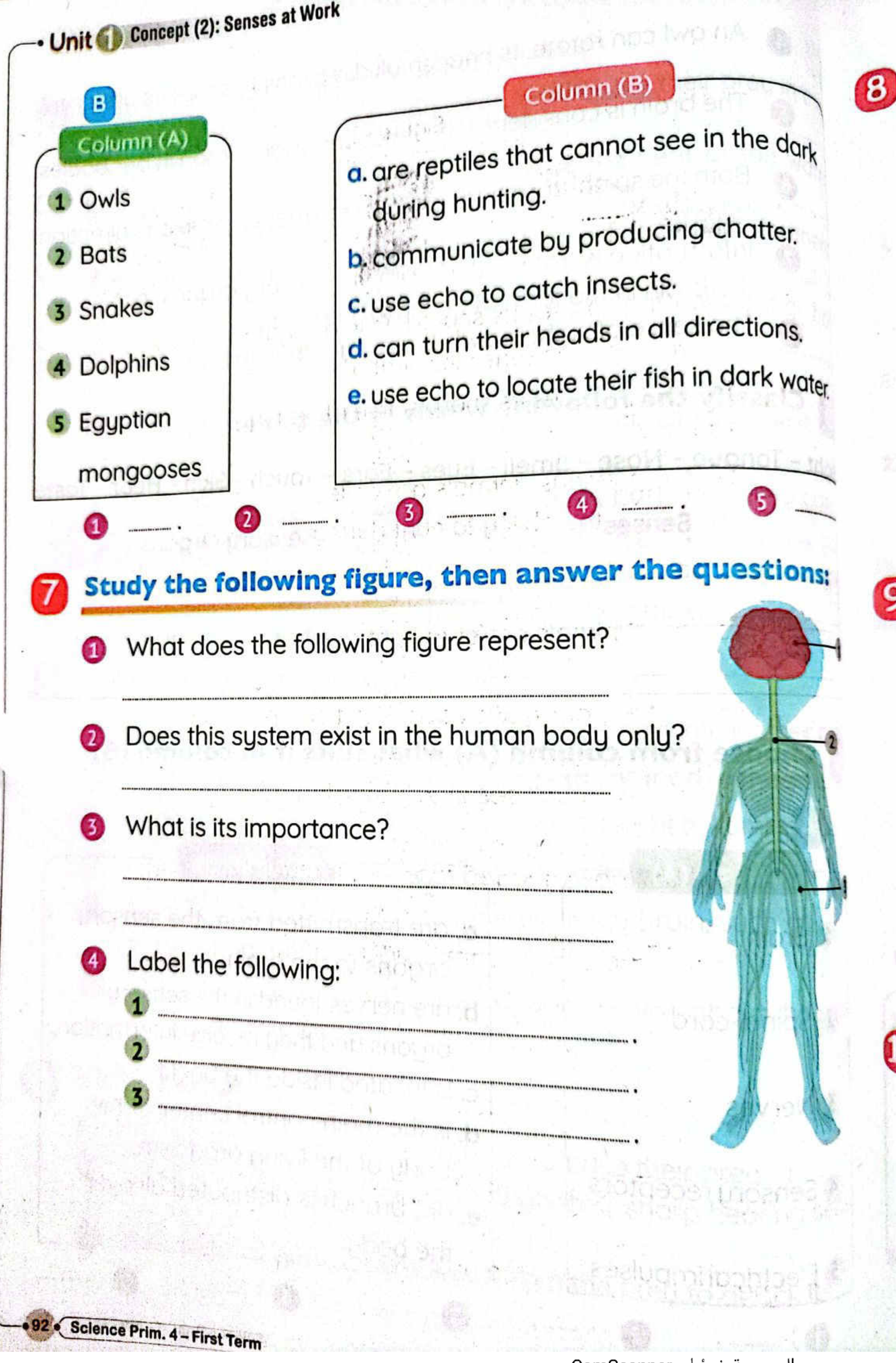
1 .... 2 .... 3 .... 4 .... 5 ....

B

Column (A)	Column (B)
1 Owls	a. are reptiles that cannot see in the dark during hunting.
2 Bats	b. communicate by producing chatter.
3 Snakes	c. use echo to catch insects.
4 Dolphins	d. can turn their heads in all directions.
5 Egyptian mongooses	e. use echo to locate their fish in dark water.

1 .... 2 .... 3 .... 4 .... 5 ....

7 Study the following figure, then answer the questions:



1. What does the following figure represent?

....

2. Does this system exist in the human body only?

....

3. What is its importance?

....

....

4. Label the following:

1 ....

2 ....

3 ....

8 Study the following figures, then complete the sentences:

Figure (1)	Figure (2)	Figure (3)

a. Figure (......) uses its sharp sense of sight to hunt at night.

b. Figure (......) can sense the heat of the warm body of its prey.

c. Figure (......) uses its sharp sense of hearing and echo to locate its prey.

d. All the previous animals are called .... animals because they have the ability to hunt during ....

9 Give reasons for:

1. Nocturnal animals prefer to hunt at night.

   ....

2. A snake has poor night vision, but it can hunt in the dark.

   ....

3. Although bats can't see in the dark, but they can find food.

   ....

4. An owl has bowl-shaped face and feathers in its head.

   ....

5. The brain is the main control center of the body.

   ....

10 What happens if:

1. The sound waves produced from a bat hit an insect body.

   ....

2. The owl has poor night vision.

   ....

3. The brain receives electrical impulses.

   ....

Lesson 3

Activity 8 Sensing the Environment

» When a girl touches the spines of a cactus plant, she will withdraw her hand fast (in less than one second).

« عندما تلمس البنت الشوك في نبات الصبار، تقوم بإبعاد يديها بسرعة.



» When a rat hears a snake moving nearby, the rat jumps fast and escapes (in less than one second).

« عندما يسمع الفأر صوت الثعبان، يقوم الفأر بالقفز سريعًا والهروب.



Nervous System • It is responsible for keeping living organisms away from danger.

الجهاز العصبي هو المسئول عن الإحساس بالخطر والابتعاد عنه.

Similarities Between Humans and Animals

» Both humans and animals use their sensory organs and nervous system to sense the surrounding environment and to avoid danger.

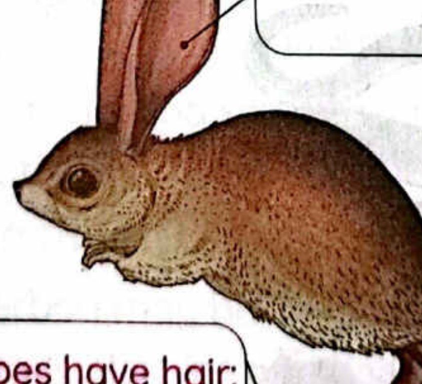
يعتمد كلّ من الإنسان والحيوان على الحواس والجهاز العصبى للإحساس بالبيئة وتجنب الخطر.

Differences Between Humans and Animals

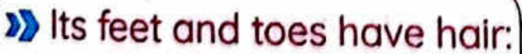
Humans	Animals
Humans don't have to run from wild animals, but they move away to be safe.	Animals have to run from wild animals.
الإنسان لا يضطر للهروب من الحيوانات المفترسة ويكتفي بالابتعاد للحفاظ على سلامته.	الحيوان يضطر للهروب من الحيوانات المفترسة.

Egyptian Jerboa اليربوع المصري

- It is considered from desert rodents.
- من القوارض الصحراوية.
- It is a tiny animal with very large ears, small eyes and long hind legs.
- إنه حيوان صغير بأذنين كبيرتين، وعينين صغيرتين، وساقين خلفيتين طويلتين.



It has large ears: • له أذان كبيرتان.
- To help it hear nearby moving snakes.
- تساعده على سماع حركة الثعابين القريبة منه.



Its feet and toes have hair:
- الشعر الموجود على قدمه وأصابعه.
- To help it catch sand when it jumps in zigzag paths to run quickly from danger.
- يساعده على إمساك الرمال عند القفز في مسارات متعرجة أثناء الهروب من الخطر.

It has long hind legs: • له ساقان خلفيتان طويلتان.
- To enable it to jump for long distances.
- لمساعدته على القفز لمسافات طويلة.

» While the jerboa looks for food at night in the desert, it stays **alert** because vipers search the desert to find food.

« بينما يبحث اليربوع عن الطعام مساءً في الصحراء، فإنه يكون في حالة تأهب لأن الأفاعي تبحث في الصحراء عن الطعام.

» The response of a jerboa to jump away from danger takes **less than one second.**

« استجابة اليربوع بالقفز للهروب من الخطر تأخذ أقل من ثانية.

How does the jerboa's body work together to avoid danger?

On hearing danger

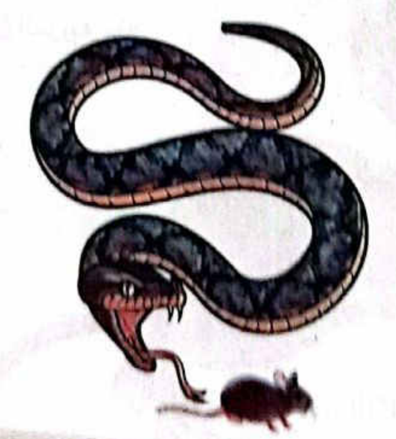


» The sensory receptors in the ears send a message through the nerves to the brain. تقوم الحواس المستقبلة في أذن اليربوع بإرسال رسالة للمخ عبر الأعصاب.

» The brain translates this information and gives a response by alerting its legs to jump.

يترجم المخ تلك المعلومة ويعطي استجابة لليربوع بالقفز للابتعاد عن الخطر.

» The jerboa's strong hopping legs start to jump away to escape from the danger. تبدأ سيقان اليربوع بالحركة والقفز للهروب من الخطر.



Reaction Time (زمن الاستجابة): It is the time taken by an organism's body to respond to danger.

هو الوقت الذي يستغرقه الكائن الحي للاستجابة للخطر.

Activity 9 Optional Activity
Nerves



1 Choose the correct answer:

1. The .... system is responsible for keeping all the living organisms away from danger.
   a. respiratory b. nervous c. digestive d. circulatory
2. Egyptian jerboa is considered as a desert ....
   a. reptile b. bird c. rodent d. mammal
3. The long hind legs in a jerboa helps it to ....
   a. stand on the hot sand b. jump for long distances
   c. catch insects from the sand d. be quiet during moving
4. The feet and toes of the jerboa have hair to ....
   a. avoid making any noise
   b. absorb the sand heat during the day
   c. stay warm and clean d. catch sand during running
5. When the jerboa searches for food, it stays alert because .... search desert for food.
   a. vipers b. insects c. penguins d. Arctic foxes
6. When the jerboa senses a snake moving towards it, ...
   a. it puffs its body to scare it b. it changes its color
   c. it jumps fast and escapes d. it digs a tunnel in the sand
7. The jerboa may become dinner for snakes at night if ....
   a. it stays alert for any danger
   b. it can't sense vipers close to it
   c. its body parts adapted well
   d. its sense of hearing is very sharp
8. The response of a jerboa to jump quickly and escape takes ....
   a. one second b. two seconds
   c. less than one second d. more than two seconds

9. .... help(s) the jerboa to stay safe from any danger.
   a. Its adapted body parts b. Its nervous system
   c. Its sensory receptors d. All the previous

10. The jerboa runs in .... paths when it escapes from danger.
   a. straight b. circular c. zigzag d. curved

2 Write the scientific term:

1. A desert rodent that has very large ears and long hind legs. (..................)
2. The system that keeps living organisms away from danger. (..................)
3. The time taken by a living organism to respond to danger. (..................)
4. It translates the information and gives response by alerting the jerboa to jump. (..................)

3 Put (✓) or (✗):

1. The jerboa is considered a rodent that has small ears and long hind legs. (   )
2. The structural adaptation of the jerboa helps it become safe. (   )
3. When escaping from danger, the jerboa jumps along a curved path. (   )
4. The reaction time always takes more than one second. (   )
5. The jerboa must be alert because snakes navigate the desert for food. (   )
6. On hearing danger, the sensory receptors in the jerboa's ears send a message to the brain. (   )

4 Complete the following sentences:

1. When you touch the spine of a cactus, you will .... your hand quickly.

2. The nervous system always keeps animals away from ....
3. The Egyptian jerboa is considered a desert .... that has .... ears, small .... and .... legs.
4. The jerboa can jump in .... paths to run quickly from any danger.
5. On hearing any danger, the sensory receptors in the .... send a message to the ....
6. The time taken by a jerboa to start running from a snake is called ....

5 Arrange the following steps:

1. (......) The jerboa jumps in zigzag paths quickly.
2. (......) The brain translates the message.
3. (......) On hearing danger, the sensory receptors sense it.
4. (......) The brain sends a response to alert the legs of the jerboa.
5. (......) The sensory receptors in the ears send a message to the brain.

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
Jerboa (Structural Adaptation)	Reason
1 Its long hind legs	a. to catch the sand during jumping.
2 The hair on its feet	b. to stay warm in the desert.
3 Its very large ears	c. to sense any noise from nearby snakes.
	d. to jump for long distances.

1. .... 2. .... 3. ....

7 Give reasons for:

1. The nervous system is very important for living organisms.

....

....

2. The jerboa has large ears.

....

....

3. The jerboa has long hind legs.

....

....

4. The feet and toes of a jerboa have hair.

....

....

8 What happens if:

1. A girl touches the spines of a cactus plant.

....

....

2. A jerboa hears a snake moving nearby.

....

....

3. The jerboa has small ears.

....

....

Lesson 4

Activity 10 Reaction Time

- We have learned that; the reaction time is very important for animals like jerboas to escape from danger.
- In this experiment, we are going to study the reaction time for visual response and auditory response.

Activity

Which one is faster (takes less time), the visual response or the auditory response

أيهما أسرع (يستغرق وقتًا أقل) - المحفز البصري أم المحفز السمعي؟



Visual Response



Auditory Response



Steps:

1. Your friend will sit on the floor, and you will stand on a chair holding a stick.
2. Leave the stick to fall and calculate the time taken by your friend to catch it.
3. Repeat these steps three more times and record the results in a table.
4. Repeat these steps while your friend closes his eyes and depend on the sense of hearing, then record the results in another table.

Results:

Table (A): Your friend used his sight sense to catch the stick - visual response:

Trial	1	2	3	4
Time	2 seconds	1.5 seconds	1 second	0.5 second

Table (B): Your friend used his hearing sense to catch the stick - auditory response.

Trial	1	2	3	4
Time	3 seconds	2 seconds	1.5 seconds	1 second

Conclusion:

» You can catch the stick faster when you see it fall than when you hear it.

« يمكنك الإمساك بالعصا بشكل أسرع عندما تراها تسقط عن سماعها.

Visual response (Takes less time)



auditory response (Takes more time)

« تعتبر الاستجابة للمحفز البصري أسرع من الاستجابة للمحفز السمعي.

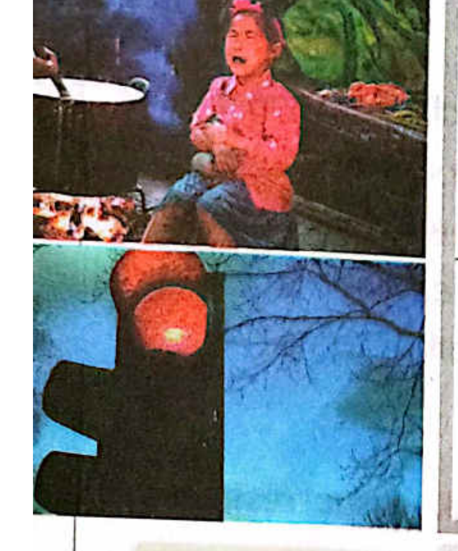


On seeing or hearing a danger



1. The sensory organs (eyes - ears) send a signal to the brain through the nerves.
2. The brain translates this signal, and then it sends a response to the muscles to avoid the danger.

Importance of reaction time:



» You move your hand away when you touch a hot object.

» Pressing the brakes when you see a red traffic light.

Reaction Time زمن الاستجابة • The time taken by an organism's body to respond to danger and stay away from it.





1 Choose the correct answer:

1. Which of the following is the correct reaction time that a deer takes to run away from a nearby lion?
   a. 0.1 second b. 1 second c. 1.5 seconds d. 2 seconds
2. The time taken by an organism's body to respond to danger is always ....
   a. one second b. two seconds
   c. less than one second d. more than one second
3. The reaction time should be short for any animal to ....
   a. find its predator easily
   b. escape quickly from the predators
   c. escape quickly from the prey d. no correct answer
4. The owl will .... the snake if the snake takes longer reaction time.
   a. run away from b. not reach
   c. catch d. escape from
5. As the reaction time decreases, the ....
   a. jerboa will catch the snake b. snake will catch the jerboa
   c. snake will escape from the jerboa
   d. jerboa will escape from the snake
6. As the reaction time becomes .... and it takes .... time, the prey will survive.
   a. faster – more b. shorter – more
   c. faster – less d. shorter – less
7. If the reaction time of a jerboa is delayed (takes more time), the ....
   a. jerboa may be the dinner for the viper
   b. jerboa will escape easily from the viper
   c. jerboa will attack the viper d. jerboa can't reach the vipe
8. The sensory receptors and the nervous system parts inside th living organism's body must work ....
   a. independently b. separately c. together d. slowly

9. You can catch the ball faster when you see it fall than when you hear it because ....
   a. the visual response takes more time than the auditory response
   b. the visual response is slower than the auditory response
   c. the auditory response is faster than the visual response
   d. the visual response is faster than the auditory response

10. The brain translates the .... then sends a/an .... to the muscles to avoid the danger.
   a. order - reaction
   b. signal - response
   c. reaction - order
   d. response - signal

2 Write the scientific term:

1. The time taken by an organism's body to respond to danger. (....................)
2. The system that is responsible for keeping the living organism away from danger. (....................)
3. It translates the signals sent by the sensory organs, then sends a response to the muscles. (....................)
4. Signals are transmitted through it from the sensory organs to the brain. (....................)

3 Put (✓) or (✗):

1. Pressing the brakes when you see a red traffic light is a visual response. (   )
2. You can catch things faster when you see them fall than when you hear them. (   )
3. As the reaction time decreases, the response of the animal becomes slower. (   )
4. The visual response takes less time than the auditory response. (   )
5. Blinking your eyes when something comes near them is an auditory response. (   )

6. The brain translates the responses, then send signals to the muscles to avoid danger. (   )
7. The reaction time should be short in any living organism. (   )

4 Complete the following sentences:

1. The brain responds to the visual stimuli .... than the auditory stimuli.
2. The sensory organs and nervous system parts work .... to avoid any danger.
3. When you touch the spines of a cactus pant, the sensory receptors in your .... send a .... to the brain, then the brain translates it and sends a .... to the muscles.
4. The visual response takes .... time than the auditory response.
5. Pressing the brakes when you see a red traffic light is a .... response.
6. Each person has his/her own reaction time and it's always .... one second.

5 Arrange the following steps:

1. (.........) The brain translates the signal.
2. (.........) The sensory receptors in the ears sense the sound.
3. (.........) The mobile makes sounds.
4. (.........) The brain sends a response to the muscles.
5. (.........) Sara holds the mobile to answer the call.
6. (.........) The sensory receptors send a signal to the brain.

6 Classify the following situations into **visual response** or **auditory response**:

	Visual Response	Auditory Response
1 When you try to catch a pencil falling from the table.	✓	
2 When you hear your mobile ringing.		

3 When the jerboa senses the noise of the viper nearby.		
4 Moving the car when the traffic sign becomes green.		
5 When you pay attention to the sound of your father.		
6 Stopping suddenly when you hear a child call you.		
7 The deer begins to run when it sees the lion coming.		
8 When the snake hears the sound of an owl, it begins to hide.		

7 Give reasons for:

1. You can catch the ruler faster when you see it fall than when you hear it.

   ....

   ....

2. You move your hand away when you touch a hot object.

   ....

   ....

8 What happens if:

1. You see a red traffic light.

   ....

   ....

2. Someone calls you.

   ....

   ....

Lesson 5

Activity 11 How the Nervous System Works

Function of the Nervous System

The nervous system is very busy; it has three functions:

1. Gathering information about the surrounding environment.
2. Translating and processing this information.
3. Telling the body what to do.

1. جمع المعلومات. 2. ترجمة تلك المعلومات. 3. إرسال استجابة مناسبة لما ينبغي أن يقوم به الجسم.

How the Nervous System Works

1. The sensory organs (eyes - ears - nose - tongue - skin) gather information about what's happening inside and outside your body.







2. The nerves carry this information (electrical impulses) from the sensory organs to the brain.
3. The brain processes this information and translates it.
4. The brain sends a signal (response) to the body to tell it what to do.

1. تعمل الأعضاء الحسية (العين - الأذن - الأنف - اللسان - الجلد) على جمع المعلومات عما يحدث داخل أو خارج الجسم.
2. ترسل الأعصاب تلك الرسائل من الأعضاء الحسية إلى المخ.
3. يقوم المخ بمعالجة البيانات وتفسيرها.
4. يقوم المخ بإرسال إشارة للجسم عما يجب فعله.

» The components of the nervous system are connected together by **nerves**.

« تتصل أجزاء الجهاز العصبي معًا بواسطة **الأعصاب**.



1. Some messages are transmitted so fast that you can't realize. They are known as "**reflexes**".

1 بعض الرسائل تصل بسرعة كبيرة وتسمى رد الفعل المنعكس.

2. Some messages are transmitted automatically, like the signal for breathing.

2 بعض الرسائل يتم نقلها للمخ تلقائيًا ولا يمكننا التحكم بها مثل التنفس.

Reflexes
رد الفعل المنعكس

A type of messages transmitted so fast by the nervous system.

نوع من الرسائل يرسلها الجهاز العصبي بشكل سريع جدًا.

Examples of the Reflex Action

» You move your hand away when you touch a hot object.	« تحريك يدك بعيدًا عند لمس جسم ساخن.
» You blink your eyes when something comes near them.	« إغماض العينين عندما يأتي جسم قريبًا منها.



Activities 12, 13, 14 & 15

Optional Activities





1 Choose the correct answer:

1. The components of the nervous system are connected to each other by ....
   a. muscles
   b. nerves
   c. tissues
   d. blood vessels

2. All the following are the components of the nervous system, except the ....
   a. brain
   b. spinal cord
   c. blood
   d. nerves

3. The nervous system is responsible for ....
   a. gathering the information
   b. translating the information
   c. telling the body what to do
   d. all the previous

4. Information is transmitted from the .... to the .... through the nerves.
   a. brain - sensory organs
   b. muscles - brain
   c. sensory organs - brain
   d. muscles - sensory organs

5. Information is transmitted through the nerves in the form of ....
   a. reflexes
   b. electrical impulses
   c. automatic response
   d. sensory receptors

6. The brain is responsible for all the following, except ....
   a. translating the information
   b. sending signals to the muscles
   c. receiving signals from the sensory receptors
   d. gathering the information

7. Which statement is wrong about the "nerves"?
   a. They connect the components of the nervous system together.
   b. They are the main control center of the body.
   c. They carry the messages from the sensory organs to the brain.
   d. They are branches that extend all over the body.

8. What is the correct sequence that explains the following figure?
 a. Eyes → Nerves → Hand → Brain
 b. Hand → Brain → Nerves → Eyes
 c. Eyes → Nerves → Brain → Hand
 d. Hand → Brain → Eyes → Nerves

9. What is the correct sequence that explains the following figure?
 a. Nose → Nerves → Brain → Hand
 b. Hand → Brain → Eyes → Nerves
 c. Nose → Nerves → Brain → Hand
 d. Hand → Nerves → Brain → Hand

10. Blinking your eyes when the light of the sun falls on it is considered ....
 a. respiration
 b. photosynthesis
 c. reflex
 d. electrical impulse

2 Write the scientific term:

1. They receive information from the surrounding environment. (.....................)
2. They connect the nervous system components together. (.....................)
3. It translates the information and sends the suitable response to the muscles. (.....................)
4. Messages that are transmitted so fast that you can't realize it. (.....................)
5. The organ that can distinguish between sugar and salt. (.....................)
6. The sense that can distinguish between rough and smooth surfaces. (.....................)

3 Put (✓) or (✗):

1. The brain is responsible for translating and collecting the information. (   )
2. All the components of the nervous system work together. (   )

3. The sensory receptors are responsible for breathing and thinking.( )
4. Nerves are branches found in all parts of the body of a living organism. ( )
5. The brain sends a signal to the body to tell it what to do. ( )
6. The components of the nervous system are connected together by tissues. ( )
7. Some messages are transmitted automatically, like the signal for breathing. ( )
8. Blinking your eyes when something comes near them is considered a reflex. ( )

4 Complete the following sentences:

1. The .... collects information about what's happening to your body.
2. The .... processes the information and makes the body respond.
3. The components of the nervous system are connected together by ....
4. .... is a type of message transmitted so fast by the nervous system.
5. The .... are the organs that make the baby recognize the sound of his mother.
6. .... is the sense that makes the jerboa recognize the noise of the viper.

5 Cross out the odd word:

1. Brain - Lungs - Nerves - Spinal cord
2. Eyes - Nose - Touch - Ears
3. Tongue - Hearing - Sight - Smell

6 Compare between the following:

P.O.C.	Sensory Receptors	Brain
Function	....	....

7 Study the following figures, and then complete:

Figure (1)	Figure (2)	Figure (3)	Figure (4)

a. Figure (......) is not from the components of the nervous system.

b. Figure (......) is the main control center of the living organism's body.

c. Figure (......) is located inside the backbone and it's connected to the brain by nerves.

d. Figure (......) is responsible for carrying the information through the body.

8 Arrange the following steps:

1

a. (.........) The girl turns around to search for the bird.

b. (.........) The girl's ears send this information to the brain.

c. (.........) The brain sends a signal to the body.

d. (.........) The girl's ears hear the sound of the bird.

e. (.........) The brain processes this information.

2

a. (.........) The rabbit runs and escapes from the snake.

b. (.........) The rabbit's eyes see the snake.

c. (.........) The brain processes this information.

d. (.........) The rabbit's eyes send this information to the brain.

e. (.........) The brain sends a signal to the body to run.

9 Give reasons for:

1 The nervous system has great functions.

....

2 You blink your eyes when something comes near it.

....

3 Light and Sight

In this concept, we are going to study:

- Examples of nocturnal animals.
- Special structure of the eye of nocturnal animals.
- Sources of light.
- Light reflection.
- Types of objects around us.
- How vision occurs.

Key Vocabulary

- Feature
- Pupil
- Light
- Reflect
- Transparent
- Opaque

Lesson 1

Activity 1 Can You Explain?

» Humans need a source of light to see what's happening around them.

« يحتاج الإنسان لمصدر ضوء ليرى ما يحدث حوله.



» Some animals can see better than humans in the dark.

« بعض الحيوانات تستطيع أن ترى أفضل من الإنسان في الظلام.



» Some animals have a spectacular night vision and are known as "nocturnal animals".

« تمتلك بعض الحيوانات رؤية ليلية وتسمى بالحيوانات الليلية.

Examples of Nocturnal Animals

Excellent Night Vision			Poor Night Vision	
Tarsier monkey	Fishing cat	Owl	Snake	Bat
				

Choose the correct answer:

1. Humans need the ________ to see what is happening around them. (sound - light)
2. The ________ is the organ that is affected by light in the human body. (eye - ear)



Activity 2 Hunting with Night Vision

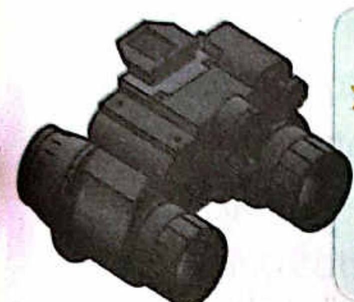
Vision in Human



- Human eyes need a <u>*source of light*</u> to see objects clearly.



تحتاج أعين الإنسان للضوء لرؤية الأشياء بوضوح.



- Humans can use <u>*night vision goggles*</u> to see in the dark.

يحتاج الإنسان لنظارات خاصة بالرؤية الليلية ليرى في الظلام.

- There are some animals that can see clearly and hunt their prey in the dark such as:



تستطيع بعض الحيوانات الرؤية جيدًا والصيد في الظلام مثل:

Fishing Cat القط السماك

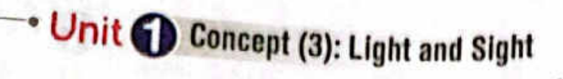
- It is a wild cat that hunts for food at night.
- Its eyes seem to glow in the dark (<u>*structural adaptation*</u>).

تتوهج (تلمع) عيون القط السماك في الظلام



- Because it has a mirror-like membrane on the back of the eye, that reflects light entering the eye and allows it to collect more available light.

وذلك لأنه يملك غشاءً رقيقًا كالمرآة في الجهة الخلفية للعين تعمل على ارتداد الضوء من الغشاء ليسمح للعين بتجميع أكبر قدر ممكن من الضوء.



Activity 3 What Do You Already Know About Light & Sight?

» Humans need a light source to see.

Source of light مصدر الضوء	Something that emits its own light. الشيء الذي ينبعث منه ضوؤه الخاص.

The sun	Electric lamp	Fire	Flashlight	Candle
				

» The sun is considered the main source of light.

« تعتبر الشمس هي المصدر الرئيسي للضوء.



» The moon is like mirrors.

- They are not sources of light, but they reflect the light of the sun falling on them.

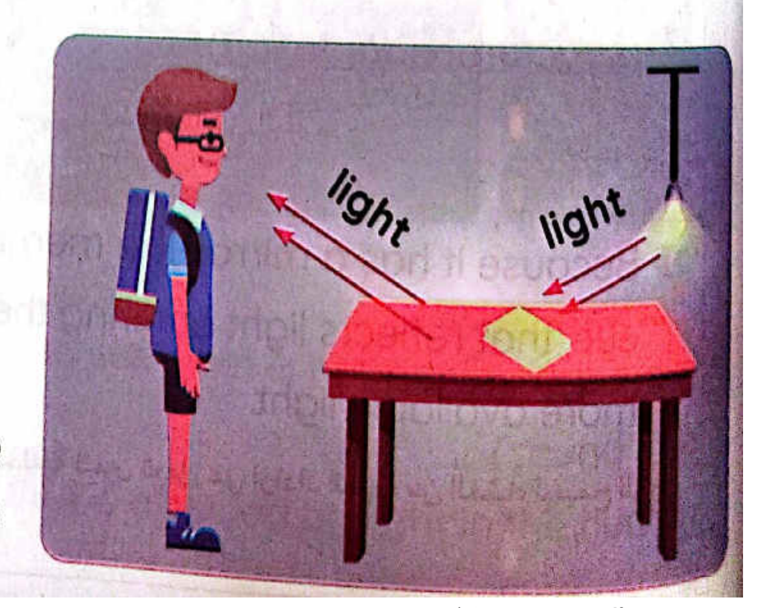
« القمر كالمرآة ليس مصدرًا من مصادر الضوء لكنه يعكس أشعة الشمس الساقطة.



How can we see things?

1. A source of light emits light.
2. Light falls on objects.
3. Light bounces off of the objects and into the eye to see them.

يسقط الضوء على الأجسام ثم ينعكس على أعيننا فنرى الأجسام.





1 Choose the correct answer:

1. The eye is the sensory organ that is affected by the ....
   a. sound b. heat c. light d. taste
2. The eyes of .... seem to glow in the dark.
   a. owls b. cats c. bats d. snakes
3. .... and .... are nocturnal animals that have poor night vision.
   a. Owls and snakes b. Bats and cats
   c. Cats and owls d. Bats and snakes
4. Fishing cats' eyes seem to glow at night, because the light rays are reflected by the .... in its eyes.
   a. lens b. membrane c. cornea d. retina
5. Fishing cats' eyes are considered an example of .... adaptation.
   a. structural b. functional
   c. behavioral d. no correct answer
6. Humans can use .... to be able to see in the complete darkness.
   a. special glasses b. night vision goggles
   c. magnifying lenses d. spectacular night vision
7. Which is the correct sequence that represents vision?
   a. Object → eye → light b. Eye → object → light
   c. Light → eye → object d. Light → object → eye
8. .... and .... are considered sources of light.
   a. Sun and moon b. Lamps and mirrors
   c. Fires and moon d. Flashlights and candles
9. The moon appears bright and shiny because ....
   a. it emits its own light b. it absorbs the light of the sun
   c. it reflects the light of the sun d. it is the main source of energy

2 Write the scientific term:

1. Animals that are active always at night. (........)
2. Animals that have eyes that glow in the dark. (........)
3. A kind of energy that enables the eye to see objects clearly. (........)

4. Objects that emit their own light. (..........)
5. It is the main source of light on the Earth. (..........)
6. A special tool that enables humans to see objects in the dark. (..........)

3 Put (✓) or (✗):

1. All nocturnal animals are characterized by having excellent night vision. (   )
2. The eye is the organ that is affected by light energy. (   )
3. Cats and bats have excellent night vision. (   )
4. Humans and cats are different in their ability to see. (   )
5. The moon is considered one of the sources of light. (   )
6. The human eye can see objects because it emits its own light. (   )
7. Fishing cats have a mirror-like membrane in front of their eyes. (   )
8. Hunting at night for nocturnal animals is considered a behavioral adaptation. (   )

4 Complete the following sentences:

1. .... and .... are nocturnal animals that have poor night vision, while .... and .... have excellent night vision.
2. Humans and cats are .... in their ability to see at night.
3. Humans need the .... to see what happening around them.
4. Nocturnal animals can see .... than human in the dark.
5. Humans can use .... to walk in the dark.
6. A mirror-like membrane is located on the ...... of the eyes of ....
7. ...... system helps humans to detect objects in the presence of light.

5 Cross out the odd word:

1. Fishing cats - Snakes - Bats (..........)
2. Candle - Torch - Moon - Electric lamp (..........)

6 Classify these environmental changes in the following table:

Snake - Owl - Bat - Fishing cat

Excellent night vision	Poor night vision
....	....

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Bats	a. can locate their prey in dark water.
2 Cats	b. have a thin membrane allowing them to see in the dark.
3 Owls	c. have the ability to sense the heat of their prey.
4 Dolphins	d. detect the sound reflected from mosquitoes.
5 Snakes	e. have bowl-shaped faces and feathers on their heads.

 ....  ....  ....  ....  ....

8 Study the following figures, then answer the questions:

1. Which of these following figures represent the correct vision in humans?

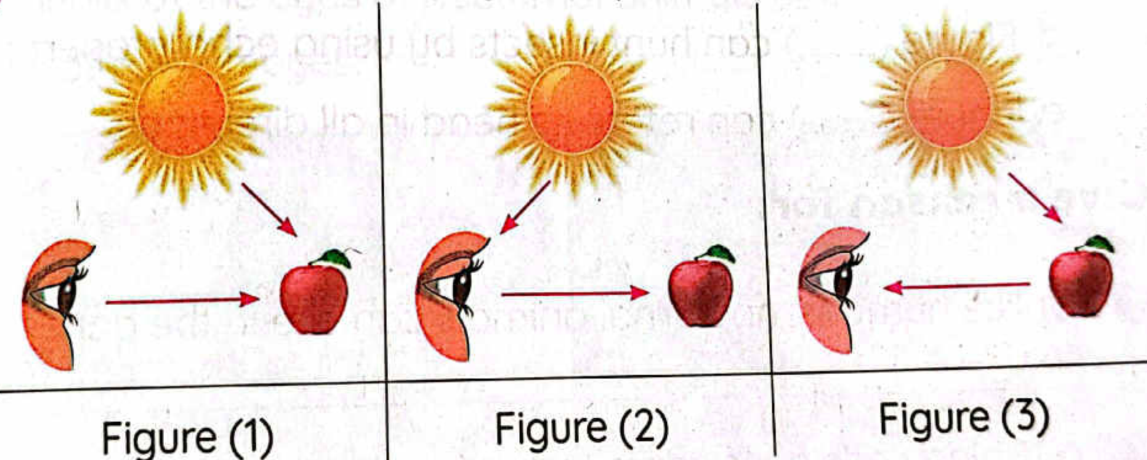


Figure (1) Figure (2) Figure (3)

2. The following figures represent two shiny objects appearing in the sky at day or at night. Study these figures, then complete the following sentences:



Figure (1)



Figure (2)

a. Figure (............) is not a source of light, but it reflects the light of figure (............) that falls on it.

b. Figure (............) is the main source of light.

3 The following figures represent different kinds of nocturnal animals, study these figures then complete the following sentences:

Figure (1)	Figure (2)	Figure (3)	Figure (4)

a. Figures (........) and (........) represent animals that have spectacular night vision.

b. Figures (........) and (........) represent animals that have poor night vision.

c. Figure (........) has eyes glow in the dark.

d. Figure (........) can hunt insects by using echo property.

e. Figure (........) can rotate its head in all directions.

9 Give a reason for:

1. Unlike humans, nocturnal animals can see in the dark.

....

2. A fishing cat's eyes seem to glow in the dark.

....

3. Although the moon is shiny, it isn't a source of light.

....

10 What happens if:

1. The fishing cat doesn't have a mirror-like membrane in its eyes.

....

2. Light falls on objects around us.

....

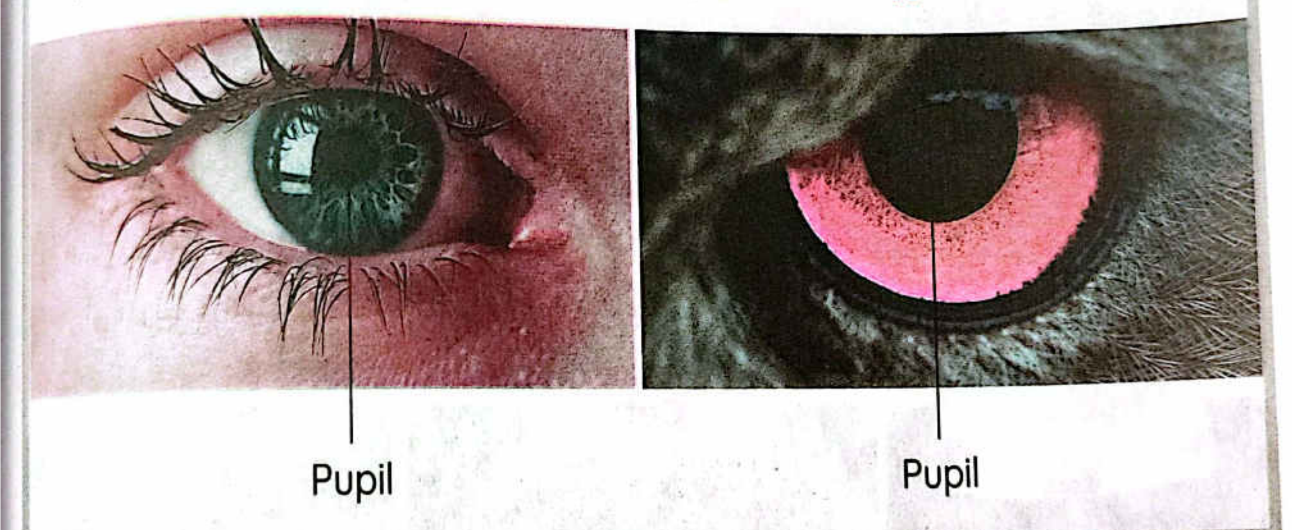
Lesson 2

Activity 4 Hunting in the Dark

» Nocturnal animals can see better than humans in the dim light.

« ترى الحيوانات الليلية بشكل أفضل من الإنسان في أضعف درجات الضوء.

- Nocturnal animals have bigger eyes than humans.
- أعين الحيوانات الليلية أكبر من عين الإنسان.
- Nocturnal animals' eyes are more sensitive to light than human's eyes.
- أعين الحيوانات الليلية أكثر حساسية للضوء من عين الإنسان.
- The pupils of the eyes of nocturnal animals open wider than the pupils of human eyes.
- حدقة العين للحيوانات الليلية أكثر اتساعًا من الإنسان.



Nocturnal Animals الحيوانات الليلية

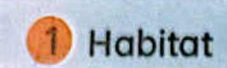
» They can detect the environment around them even in the weakest light level.

« تستطيع الحيوانات الليلية رؤية البيئة من حولها بأقل مستوى ضوء ممكن.

» In complete darkness, they depend on other senses, such as hearing, smell and touch.

« تعتمد الحيوانات الليلية في الظلام على بعض الحواس الأخرى كالسمع والشم واللمس.

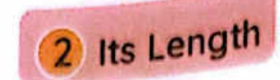
The Tarsier Monkey قرد التارسير
(Primate monkey)



1 Habitat

South East Asia

جنوب شرق آسيا



2 Its Length

About 10 centimeters (without its tail)

طوله 10 سم بدون الذيل

3 Its Food

It feeds on insects, birds and small lizards.

يتغذى على الحشرات والطيور والسحالي



Tarsier monkey is like the owl in some structural adaptations.

يشبه قرد التارسير البومة في بعض التكيفات التركيبية.

Eyes

- They have huge eyes like the owl, whrere their eyes can't move inside their eyes socket.
  - To gather and reflect any available light and then see clearly.

- أعين قرد التارسير كبيرة كأعين البوم.
  - لتجميع أي ضوء من حولها ومن ثم عكسه والرؤية بوضوح.

Head

- They can turn their heads 180 degrees like the owl
  - To focus on far or near objects at night.

- يستطيع قرد التارسير أن يدير رأسه ١٨٠ درجة مثل البومة.
  - من أجل التركيز على الأجسام البعيدة أو القريبة في الليل.





Humans	Cats	Tarsier Monkeys
They need a light source because human eyes allow less light to pass.	The eye is sensitive to light due to the presence of cell membrane at the back of the eye.	The eye is large enough to collect much light.
They can't see in the dark.	They have a good night vision.	They have a good night vision.

Lesson 3



Activity 7 Special Eye Structures

» Some animals have a unique structure in their eyes called "tapetum lucidum" (tapestry of light) that allows them to see better in the dark.

« بعض الحيوانات تمتلك تركيبًا مميزًا في العين يسمى البُساط الشفاف (نسيج الضوء) ويسمح لها برؤية ليلية أفضل.

Examples:

Deer



Horses



Dogs



Cats



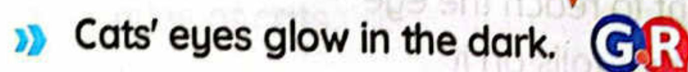


Tapetum Lucidum
البساط الشفاف

(Structural adaptation)

It is a thin layer at the back of the eye that reflects the light.

هي طبقة رقيقة في مؤخرة العين تعكس الضوء.



» **Cats' eyes glow in the dark.**



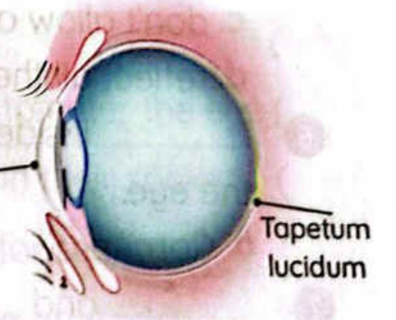
G.R

« تلمع أعين القطط في الظلام.

- Due to reflection of light from the tapetum lucidum.



« بسبب انعكاس الضوء من البساط الشفاف.



Tapetum lucidum importance:

» Hunting at night.

» Avoid being hunted at night.

How it works:

» When light enters the eye and falls on tapetum lucidum, it bounces off it like a mirror.



1 Choose the correct answer:

1. In complete darkness, many nocturnal animals can detect the environment using all the following senses, except ....
   a. hearing b. touch c. sight d. smell
2. In a dark room, a human can find his cat by using any of the following, except ....
   a. a flashlight
   b. a night vision goggles
   c. his sense of sight
   d. his sense of hearing
3. The pupils of nocturnal animals open .... that of human.
   a. wider than b. similar to c. narrower than d. typical to
4. Nocturnal animals have eyes .... the humans eyes.
   a. smaller than
   b. weaker than
   c. similar to
   d. bigger than
5. The pupils of the eyes of nocturnal animals ....
   a. allow less light to enter the eye
   b. allow more light to enter the eye
   c. don't allow any light to reach the eye
   d. reflect all the light that falls on it
6. .... inside the eye controls the amount of light that enters the eye.
   a. Cornea b. Lens c. Membrane d. Pupil
7. .... and .... can't move their eye in their sockets.
   a. Owls and snakes
   b. Cats and tarsiers
   c. Tarsiers and owls
   d. Humans and cats
8. A tarsier can turn its .... like owls.
   a. eyes b. head c. legs d. tongue
9. All these animals have tapetum lucidum in the back of their eyes, except ....
   a. deers b. cats c. owls d. horses

2 Write the scientific term:

1. A kind of adaptation in which nocturnal animals have adapted to hunt at night. (..................)
2. A structure inside the eye that controls the amount of light that enters the eye. (..................)
3. A structure inside the cat's eye that reflects the light rays that fall on it. (..................)
4. A bird that depends on echo to locate its prey. (..................)
5. A bird that can turn its head 180 degree. (..................)
6. A tiny mammal that can turn its head 180 degrees. (..................)

3 Put (✓) or (✗):

1. All nocturnal animals have spectacular and excellent night vision. (   )
2. Owls, cats and snakes have spectacular and excellent night vision. (   )
3. A human's eye is more sensitive to light than a cat's eye. (   )
4. The pupils of human eyes open narrower than the eyes of cats. (   )
5. Cats have wide pupils to allow less light to enter the eye. (   )
6. Owls and tarsiers can move their eyes in their sockets. (   )
7. The nervous system is very important for seeing. (   )
8. In the absence of light, human can't see anything. (   )
9. It is much easier for human to see objects in dim light. (   )
10. Tapetum lucidum is a life-saving structural adaptation. (   )
11. Tapetum lucidum is considered a behavioral adaptation. (   )

4 Complete the following sentences:

1. Many nocturnal animals adapted to hunt their .... at ....
2. In the complete darkness, nocturnal animals can depend on other senses such as ...., ... and ....
3. .... can move its eye independently, while .... and .... can't move their eyes in their sockets.
4. Human eyes are .... than that of cats' eyes.
5. Although .... and .... are nocturnal animals but they have a poor night vision.
6. Tarsier eats different kinds of food such as ...., ..., and ....

5 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Human	a. has a thin membrane that allows it to see in the dark.
2 Owl	b. can sense the heat of its prey in the dark.
3 Tarsier	c. can eat insects, small lizards and birds.
4 Bat	d. uses night vision goggles to see things in the dark.
5 Snake	e. has a bowl-shaped face and feathers on its head.
6 Fishing cat	f. detects the sound reflected from mosquitoes.

1 .... 2 .... 3 .... 4 .... 5 .... 6 ....

B

Column (A)	Column (B)
1 Brain	a. send message to the brain through the nerves.
2 Nerves	b. controls the light that enters the eye.
3 Human eye	c. reflects the light rays that falls on it.
4 Pupils	d. translates and processes information.
5 Tapetum lucidum	e. transmit messages between the brain and the eye.

1 .... 2 .... 3 .... 4 .... 5 ....

6 Study the following figures, then complete the following:

Figure (1)	Figure (2)	Figure (3)	Figure (4)

a. Figure (..........) can move each eye independently.

b. Figures (..........) and (..........) can turn their head 180 degrees.

c. Figure (..........) needs night vision goggles to see in the dark.

7 Give reasons for:

1. The pupils of the nocturnal animals' eyes open wider than humans eyes.

....

....

2. Tarsiers can turn their heads 180 degrees.

....

....

3. The tapetum lucidum is very important in some nocturnal animals.

....

....

4. Cats' eyes glow in the dark.

....

....



Lesson 4



Activity 8 Reflection

Activity to Show Light Reflection

Steps:

- Direct the flashlight at a mirror, a piece of clothing and some wood.











Observation:

1. Mirror reflects most light rays that fall on it.
2. Clothes reflect some light rays that fall on it.
3. Wood reflects some light rays that fall on it.

Conclusion:

- Shiny (smooth) materials, such as (mirrors - metals) reflect most lig rays that fall on them.
- Rough materials, such as (wood - clothes - papers) reflect some lig rays that fall on them.

Light Reflection
انعكاس الضوء

It is the bouncing of light rays when they fall on a reflective surface

هو ارتداد أشعة الضوء عندما تسقط على سطح عاكس.

Activity 9 Light Strikes Matter

Interaction of Light with Matter

تداخل الضوء مع المواد

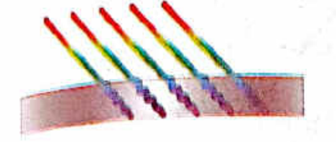
» Light is a form of energy that travels in straight line in the form of waves.

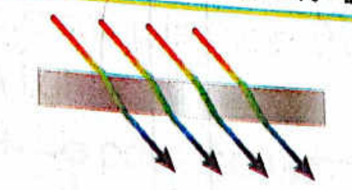
« يعد الضوء من إحدى صور الطاقة وينتقل في خطوط مستقيمة على شكل أمواج.

When light falls on an object

عندما يسقط الضوء على الجسم

Some light is absorbed	Some light passes	Some light is reflectd
يمتص الجسم بعض الضوء	يمر بعض الضوء عبر الجسم	يعكس الجسم بعض الضوء







Materials are classified into:

Transparent Materials

الأجسام الشفافة

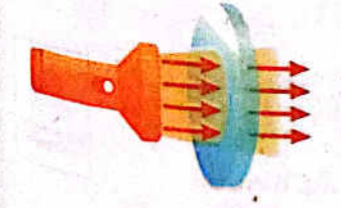
» They are the materials that allow light to travel through.

« هي الأجسام التي تسمح للضوء بالمرور خلالها.

» Things can be seen behind them.

« نرى الأشياء خلفها بوضوح.

» **Examples:** air - water - window - lenses.





Opaque Materials

الأجسام المعتمة

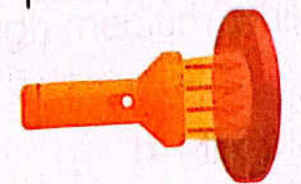
» They are the materials that don't allow light to travel through.

« هي الأجسام التي لا تسمح للضوء بالمرور خلالها.

» Things can't be seen behind them.

« لا نرى الأشياء خلفها.

» **Examples:** human body - plastic - wood - metal.



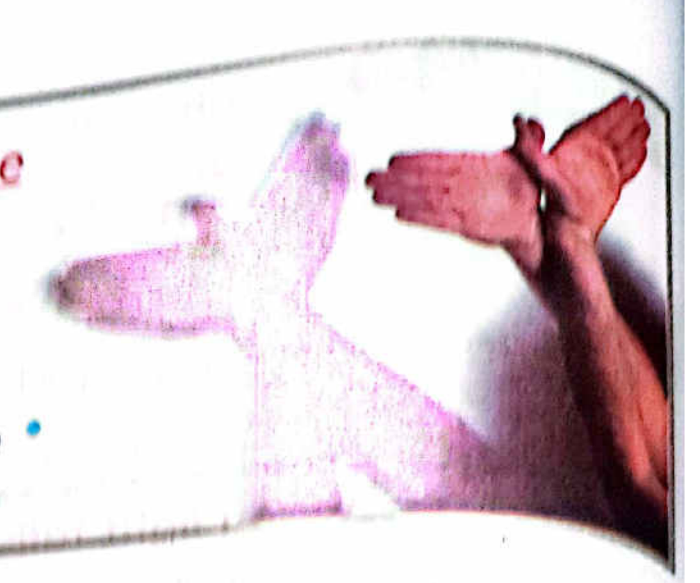




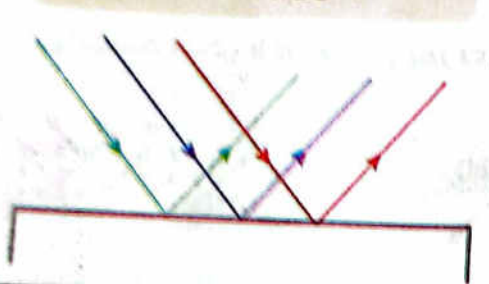
Shadows happen because

- When light hits the body (opaque object), no light will pass through it.

- يحدث الظل عندما يسقط الضوء على جسم معتم فلا يستطيع الضوء المرور خلال الجسم.



Reflection on Shiny Surface



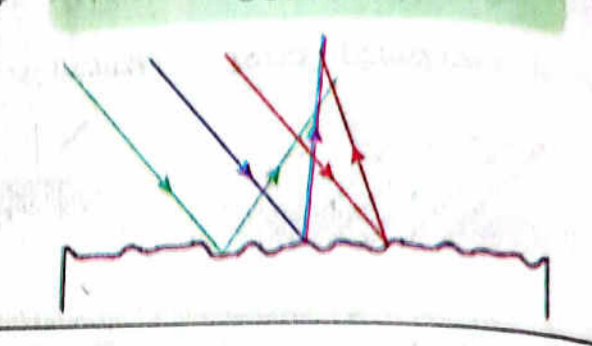
» If the surface is smooth, such as a (polished) mirror.

« عندما يكون السطح ناعمًا كالمرآة.

» Light rays are reflected in the same direction.

« تنعكس أشعة الضوء في نفس الاتجاه.

Reflection on Rough Surface



» If the surface is rough (painted), such as wood.

« عندما يكون السطح خشنًا كالخشب.

» Light rays are reflected in different directions.

« تنعكس أشعة الضوء في اتجاهات مختلفة.

Rough Surfaces • Scatter or diffuse light.

Activities 10, 11, 12 & 13

Optional A...



1 Choose the correct answer:

1. Reflection of light requires ....
   a. a light source
   b. a sound source
   c. a mirror
   d. a & c
2. A polished mirror .... that fall on it.
   a. reflects some light rays
   b. reflects most light rays
   c. absorbs some light rays
   d. absorbs most light rays
3. The moon appears shiny in the sky at night because ....
   a. it emits its own light
   b. it allows sunlight to pass through it
   c. it absorbs all the sunlight that falls on it
   d. it reflects sunlight that falls on it
4. All the following are considered rough surfaces, except ....
   a. wood   b. clothes   c. metal   d. paper
5. All the following reflect the light rays that fall on them, except ....
   a. moon   b. mirror   c. flashlight   d. clothes
6. .... reflects the most light rays that fall on it.
   a. Plastic spoon
   b. Metallic spoon
   c. Wooden spoon
   d. Piece of rock
7. Wood reflects light .... a mirror.
   a. similar to   b. more than   c. less than   d. typical to
8. .... reflects light better than clothes.
   a. Glass   b. Wood   c. Paper   d. Mirror
9. .... is considered a rough medium, while .... is considered a shiny medium.
   a. Glass – plastic
   b. Mirror – glass
   c. Glass – mirror
   d. Wood – air

10. A piece of clothing is considered a ....
    a. source of light
    b. transparent medium
    c. smooth surface
    d. rough surface

11. Light rays travel in the form of .... lines in the air.
    a. curved
    b. straight
    c. circular
    d. zigzag

12. The human body always forms a shadow because .... light can pass through it.
    a. no
    b. some
    c. most
    d. all

13. When the light of the sun falls on an opaque object, a/an .... is formed.
    a. rainbow
    b. dark shadow
    c. image
    d. no correct answer

14. All of these materials are opaque objects, except ....
    a. wood
    b. lenses
    c. human body
    d. plastic

15. You can see your friend clearly if he stands behind a ....
    a. glass window
    b. shiny mirror
    c. wooden door
    d. metallic door

16. .... is considered a transparent medium.
    a. Wood
    b. Mirror
    c. Plastic
    d. Air

17. The object in figure .... is considered an opaque medium.
    a.
    b.
    c.

18. Light rays will reflect in the same direction if they fall on a ....
    a. painted mirror
    b. polished mirror
    c. painted wood
    d. clear glass

19. .... surfaces scatter and diffuse light rays.
    a. Shiny
    b. Smooth
    c. Rough
    d. Polished

2 Write the scientific term:

1. The bouncing of light rays when they fall on a reflecting surface. (..................)
2. Materials that allow most of light that falls on them. (..................)
3. Materials that we can't see anything behind it. (..................)
4. A material that light rays bounce off from it. (..................)
5. A dark area that is formed when light falls on an opaque object. (..................)
6. It isn't considered a source of light although it appears shiny in the sky. (..................)
7. It is the main source of light that emits light and heat. (..................)

3 Put (✓) or (✗):

1. Shiny objects include mirrors, metals and glass. (   )
2. Mirrors reflect light less than plastic. (   )
3. Smooth materials reflect light more than rough materials. (   )
4. Wood, plastics and metals are considered examples of rough materials. (   )
5. The human body is considered a reflective surface that always forms a shadow. (   )
6. The moon is considered a reflective surface, such as a mirror. (   )
7. A shadow is formed when light falls on a reflective surface. (   )
8. The kind of the light reflection depends on the material that light falls on. (   )
9. Light waves travel in the air in the form of curved lines. (   )

4 Complete the following sentences:

1. Shiny and smooth materials such as .... and ....
2. Rough surfaces include .... and ....
3. Wood reflects .... amount of light because it is considered .... object.
4. Light rays travel in the form of .... in .... lines.
5. .... and .... don't allow light to pass through them as they are considered .... materials.
6. A dark area called .... is formed when light falls on .... medium.
7. Transparent mediums include ...., ... and ....
8. Things can't be seen behind .... materials.
9. .... surfaces scatter and .... light rays that fall on them.
10. Polished mirror reflects light rays in the the same ....

5 Cross out the odd word:

1. Sun – Moon – Stars - Flashlight (..........)
2. Wood – Plastic – Air (..........)
3. Clear water – Milk – Air (..........)

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Sun	a. reflect light rays in one direction.
2 Shadow	b. reflect light rays in different directions.
3 Moon	c. is the main source of energy.
4 Smooth surfaces	d. is shiny but isn't considered a source of energy.
5 Rough surfaces	e. is formed when the light strikes a human body.

1 .... 2 .... 3 .... 4 .... 5 ....

7 Classify the following in this table:

1. Wood - Clear glass - Metal - Book - Skin - Milk - Lenses

Transparent Mediums	Opaque Mediums
....	....
....	....

2. Mirror - Wood - Glass - Metal - Plastic

Shiny Surfaces	Rough Surfaces	Transparent Surfaces
....	....	....
....	....	....

8 Study the following figures, then answer the questions:

1. The opposite figure represents the formation of a shadow.
   Complete:
   a. The human body is considered .... medium.
   b. The formation of a shadow requires .... and ....

2. The following figures represent two types of light reflection:
   Choose the correct word from the following:
   (transparent - smooth - rough - mirror - wood - glass)

   Figure (1) Figure (2)

   a. Figure (1) represents reflection of light from a .... surface.
   b. Figure (2) represents reflection of light from a .... surface.
   c. The surface in figure (1) may be ....
   c. The surface in figure (2) may be ....

9 Give reasons for:

1. We can see objects behind transparent materials.
....
....

2. The human body forms a shadow when light falls on it.
....
....

3. Mirrors reflect light more than plastic.
....
....

10 What happens if:

1. Light falls on a mirror.
....
....

2. Light falls on a plastic bottle.
....
....



Concept 4

Communication and Information Transfer

In this concept, we are going to study:

- Firefly light show.
- Communication among whales.
- Transferring information among people.
- Morse code.
- Types of objects around us.
- Communication among honeybees.
- Communication among ants.
- Technology inspired by nature.

Key Vocabulary

- Feature
- Code
- Echolocation
- System
- Pitch sound

Lesson 1

Activity 1 Can You Explain?



» Humans and animals send or receive information using <u>different communication systems</u>.

« يستطيع البشر والحيوانات إرسال واستقبال المعلومات بطرق تواصل مختلفة.

1 Light الضوء

» Humans use light to communicate.

« يستخدم البشر الضوء للتواصل.



» Some animals use light to communicate.

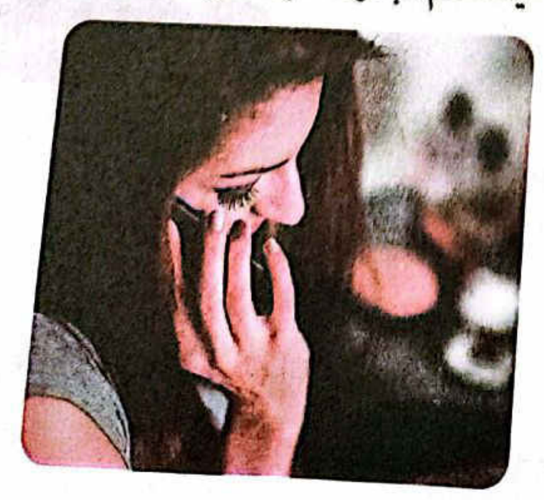
« تستخدم بعض الحيوانات الضوء للتواصل.



2 Sound الصوت

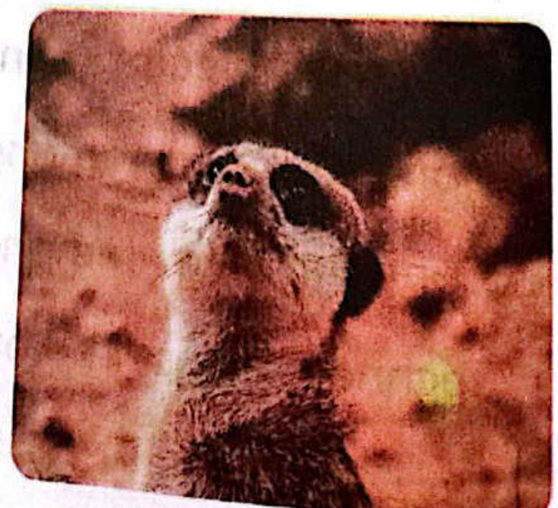
» Humans use sound to communicate.

« يستخدم البشر الصوت للتواصل.



» Some animals use sound to communicate.

« تستخدم بعض الحيوانات الصوت للتواصل.



Activity 2 Firefly Light Show

Firefly Light Show عرض الخنافس المضيئة



In the mangroves trees of Thailand
على أشجار المنجروف بتايلاند

- A chemical reaction happens inside their bodies, so they light up.
  - يحدث تفاعل كيميائي داخل أجسام الخنافس مما يجعلها تضيء.
- Their wings flash at regular intervals to warn off predators or attract a mate for reproduction.
  - تستخدم الخنافس الأجنحة لإطلاق ومضات ضوء على فترات منتظمة من أجل التحذير من قدوم حيوانات مفترسة أو جذب الجنس الآخر من أجل التكاثر.
- Firefly beetles change their flash pattern when another group comes nearby.
  - تغير الخنافس المضيئة النمط الذي تومض به عندما تقترب منها مجموعة أخرى.

Human and Fireflies الإنسان والخنافس المضيئة

Steps

- A group of artists set up LED lights to flash in forests and adjusted it to go on and off at regular time periods.
  - قام مجموعة من الفنانين بضبط المصابيح في الغابة لتضيء وتطفئ على فترات زمنية متساوية.



Observation

- A large group of fireflies responded by flashing back in the same time.
  - استجابت مجموعة كبيرة من الخنافس بالوميض في نفس الوقت.



Activity 4 Evaluate Like a Scientist

» Classify these different ways of communication into human, animal or both.

	Human	Animal
1 Displaying light: عرض الضوء	✓	✓
2 Writing: الكتابة	✓	
3 Echolocation: صدى الصوت		✓
4 High-pitched sound: صوت عالي التردد (حاد)	✓	✓
5 A cell phone: الهاتف الخلوي	✓	
6 An electronic reader: قارئ إلكتروني	✓	





1 Choose the correct answer:

1. All of the following are ways to communicate among humans, except ....
   a. writing b. language c. reading d. echolocation
2. Echolocation is a kind of adaptation among ....
   a. humans only b. plants only
   c. some animals d. all animals
3. Fireflies produce a .... reaction in their bodies that allows them to light up.
   a. physical b. biological c. chemical d. nuclear
4. Displaying light inside fireflies' bodies is considered ....
   a. structural adaptation only b. behavioral adaptation only
   c. structural and behavioral adaptations
   d. no correct answer
5. Fireflies light up their wings for all of the following reasons, except ....
   a. warning off predators b. communicating together
   c. hiding from the prey d. attracting a mate
6. .... and .... can communicate using light.
   a. Humans and plants b. Animals and plants
   c. Humans and birds d. Humans and fireflies

2 Write the scientific term:

1. A kind of beetle that lights up its wings. (........)
2. They can communicate by different languages. (........)

3 Put (✓) or (✗):

1. Humans and animals use light to communicate. ( )
2. Fireflies light up their wings to warm their bodies. ( )

3. The wings of fireflies flash due to a biological reaction inside their bodies. ( )
4. Humans are the only living organism that communicate using language. ( )

4 Complete the following sentences:

1. Some animals use their strong .... or .... senses to find the prey.
2. The wings of fireflies .... due to .... reaction inside their bodies.
3. .... and .... use echo to communicate and hunt the prey.
4. Humans and animals can communicate by .... and ....

5 Cross out the odd word:

1. Human – Reading – Writing – Animals – Speaking
2. Dolphins – Humans – Bats – Echo

6 Classify the following according to the type of communication:

Watching TV – Light show – Cell phones – Echo

Humans	Bats	Fireflies
....	....	....
....	....	....

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Humans	a. hunt mosquitoes by using echo.
2 Bats	b. light up their wings to attract a mate.
3 Dolphins	c. can communicate by writing and reading.
4 Fireflies	d. detect the sound reflected from fish.

1 .... 2 .... 3 4

8 Study the following figures, then answer the questions:

		
Figure (1)	Figure (2)	Figure (3)

a. Figure (....) communicates by speaking, reading and writing.

b. Figure (....) communicates by using echolocation property.

c. Figures (....) & (....) communicate by light.

d. Figures (....) & (....) communicate by sound.

e. Figure (....) has a strong sense of hearing.

f. Figure (....) can communicate by cell phone.

g. Figure (....) lights up its wings to attract a mate.

h. Figure (....) has poor night vision but can still hunt at night.

9 Give reasons for:

1. The firefly lights up its wings.

   ....

   ....

2. The ability to communicate using languages separates humans from animals.

   ....

   ....

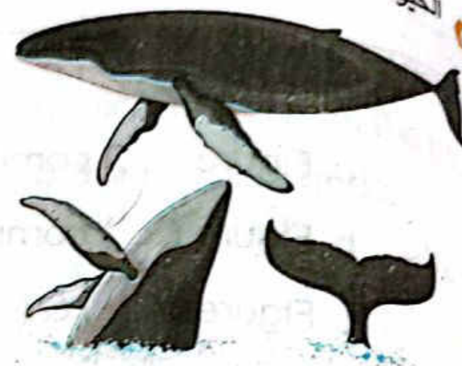
Lesson 2

Activity 5 Songs of Whales

» Animals can't talk like humans but they can use other ways to communicate.

الحيوانات لا تستطيع الكلام مثل الإنسان ولكن تستخدم طرقًا أخرى للتواصل.





Sound can be classified into

High pitched sound (Soft sound)
درجة صوت حادة (صوت ناعم)

Examples:

Voices of women or birds.





Low pitched sound (Rough sound)
درجة صوت غليظة (صوت خشن)

Examples:

Voices of men or lions.







How Humpback Whales Communicate:

كيف تتواصل الحيتان الحدباء؟

- They sing a wide range of tones and make music to communicate with each other.

- تغني الحيتان الحدباء بنغمات مختلفة للتواصل مع بعضها تحت المياه.



- They change their **sound pitch** according to seasons.

- تغير الحيتان الحدباء حدة صوتها حسب الفصول المناخية.

In winter months

(Mating season) موسم التزاوج

- Songs of humpback whales have **high-pitched sounds** that travel better through **cold water**.

تعلو حدة صوتها في فصل الشتاء حيث تنتقل تلك الأصوات بسهولة في المياه الباردة.

In summer months

(Feeding season) موسم الغذاء

- Songs of humpback whales have **low-pitched sounds** that travel better through **warm water**.

تقل حدة صوتها في فصل الصيف حيث تنتقل تلك الأصوات بسهولة في المياه الدافئة.



Activity 6 Transferring Information

Ways of Transferring Information

طرق انتقال المعلومات

» Eyes use light energy to gather information from the environment and communicate with each other.

» تستخدم العين الطاقة الضوئية لجمع المعلومات من البيئة والتواصل مع بعضها.

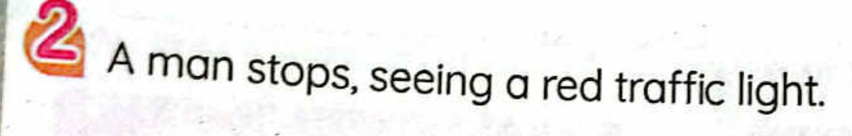
Types of information that eyes receive:



1. Your friend waves to you, and you understand him.

« صديق ما يلوح لك بيده.

2. A man stops, seeing a red traffic light.



« التوقف عند رؤية إشارة المرور حمراء.

3. Using a rescue flare to communicate across long distances.

« استخدام شعلة إنقاذ للتواصل عبر مسافات بعيدة.

4. Hikers use **mirrors** to attract rescue helicopters.

« استخدام الرحالة المرايا لجذب طائرات الهليكوبتر لإنقاذهم.

5. Lighthouses encode information in flashes to sailors.

« تقوم المنارات بإرسال رسائل (ومضات ضوئية) للبحارة في السفن.



Code
الشفرة

It is a pattern that has a meaning.

هي نمط له معنى.

» Humans use codes to transmit information.

» يستخدم الإنسان الشفرات في نقل المعلومات مثل:



Thumbs-up code:
Means that you are saying "Yes".
Thumbs-down code:
Means that you are saying "No".

» رفع الإبهام لأعلى (تعني الموافقة) أو خفضه لأسفل (تعني الرفض).








Facial expressions

» تعبيرات الوجه.





Language: It is a code in the form of sound.

» اللغة هي وسيلة للتواصل في شكل طاقة صوتية.





Writting: It is a code in the form of symbols or letters giving a specific meaning.

» الكتابة هي طريقة للتواصل في شكل رموز أو حروف تُعطي معنى معيناً.



Sign Language: Used by people with special needs.

» تستخدم لغة الإشارة بواسطة الأشخاص ذوي الاحتياجات الخاصة.

Exercises

1 Choose the correct answer:

1. The voice of a man is rough it is a .... sound.
   a. low-pitched b. high-pitched c. sharp d. soft
2. Songs of humpback whales have low-pitched sound during .... seasons.
   a. migration b. hibernation c. mating d. feeding
3. High-pitched sound is characterized by: ....
   a. it travels in cold water better than warm water
   b. it travels in warm water better than cold water
   c. it travels easily in both cold water and warm water
   d. it can't travel in both cold water and warm water
4. All of the following are considered forms of codes, except ....
   a. facial expressions b. language c. sleeping d. writing
5. All of the following are information received by the eye, except ....
   a. someone waving at you b. seeing a red traffic
   c. lighthouses codes d. speaking
6. Language is a code in the form of .... energy.
   a. light b. sound
   c. thermal d. chemical
7. Thumbs-up is a code that means .... are saying.
   a. you are saying no b. you are saying yes
   c. you are angry d. you are tired

2 Write the scientific term:

1. Energy that is used to communicate among humpback whales. (........)
2. Energy that is used to communicate among fireflies. (........)

3 Put (✓) or (✗):

1. Men have high-pitched and rough sound. ( )
2. Humpback whales change their sound pitch according to seasons. ( )
3. Humpback whales produce a low-pitched sound in mating season. ( )
4. Low-pitched sound transfers in warm water better than cold water. ( )
5. Flashes of lighthouse are a code that is detected by the ear. ( )
6. Speaking a language is a code that is detected by the eye. ( )
7. Thumbs-down code means that you are angry. ( )
8. Facial expression is a code that can be received by the eye. ( )
9. People use a rescue flares to communicate across long distances. ( )
10. Fireflies can communicate with each other using sound energy. ( )

4 Complete the following sentences:

1. Men have a .... pitched sound, while women have a .... pitched sound.
2. Humpback whales change their .... according to ....
3. .... pitched sound transfers in cold water better than .... pitched sound.
4. Winter is considered the .... season for humpback whales.
5. Songs of humpback whales have low-pitched sounds that travel better through .... water in ....
6. .... is a pattern that has meaning and humans use it to ....
7. Seeing a red traffic sign is a code that can be received by .... then translated inside ....

8. Humans use a .... to communicate across long distances.
9. Hikers use .... to attract rescue helicopters.
10. Lighthouses encode information in flashes to ....
11. .... is the code in a form of sound that humans can communicate through.
12. Humpback whales use .... energy to communicate together.

5 Cross out the odd word:

1. High-pitched sound - Women - Low-pitched sound
2. Winter - Feeding season - Mating season
3. Thumbs-up - Code - Human - Yes - No
4. Fireflies - Humpback whales - Humans - Sound energy

6 Classify the following according to the type of communication:

Humpback whale - Firefly - Human

Sound	Light	Light & sound
....	....	....
....	....	....

7 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Man	a. has low-pitched sound.
2 Woman	b. light up their wings to attract a mate.
3 Fireflies	c. has high-pitched sound.
4 Humpback whales	d. sing a wide range of tones to communicate.

1 .... 2 .... 3 .... 4 ....

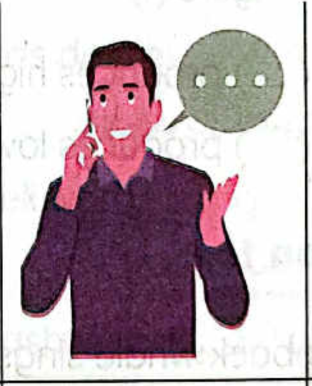
B

Column (A)	Column (B)
1 Facial expression	a. a way of communication by sound.
2 Thumbs-up	b. a code in the form of symbols or letters.
3 Thumbs-down	c. means you are saying yes.
4 Language	d. means you are angry or happy.
5 Writing	e. means you are saying no.

1 .... 2 ....  ....  ....  ....

8 Study the following figures, then answer the questions:

1 The following figures represent different codes done by humans:

			
Figure (1)	Figure (2)	Figure (3)	Figure (4)

a. Figure (........) is a code that means you are angry.

b. Figure (........) is a code in the form of sound.

c. Figure (........) is a code that means you are saying "Yes".

d. Figure (........) is a code in the form of letters and symbols that have a meaning.

2. The following figures represent two living organisms:

Figure (1) | Figure (2)

a. Figure (.....) attracts a mate by producing light patterns.

b. Figure (.....) attracts a mate by producing sound tones.

3. The following figures represent two living organisms:

Figure (1) | Figure (2)

a. Figure (.....) produces high-pitched sound.

b. Figure (.....) produces low-pitched sound.

9 Give a reason for:

1. The humpback whale sings a wide range of tones.

....

....

2. Songs of humpback whales have high-pitched sounds in winter.

....

....

10 What happens if:

- Songs of humpback whales have low-pitched sounds in winter.

....

....

Lesson 3

Activity 7 Inventing a Code

» Humans designed codes system depending on sound and light.

« قام الإنسان بتصميم نظام الشفرات يعتمد على الصوت أو الضوء.

Morse code
شفرة مورس



» It is one of the communication systems for long distances that was developed by Samuel Morse.

« تعتبر إحدى وسائل الاتصال عبر المسافات البعيدة التي طورها العالم مورس.



» It consists of short beeps known as dots.

« يتكون من أصوات تنبيه قصيرة تعرف بالنقاط.

» It consists of long beeps known as dashes.

« يتكون من أصوات تنبيه طويلة تعرف بالشرطات.

» Morse code allows people to spell words using:

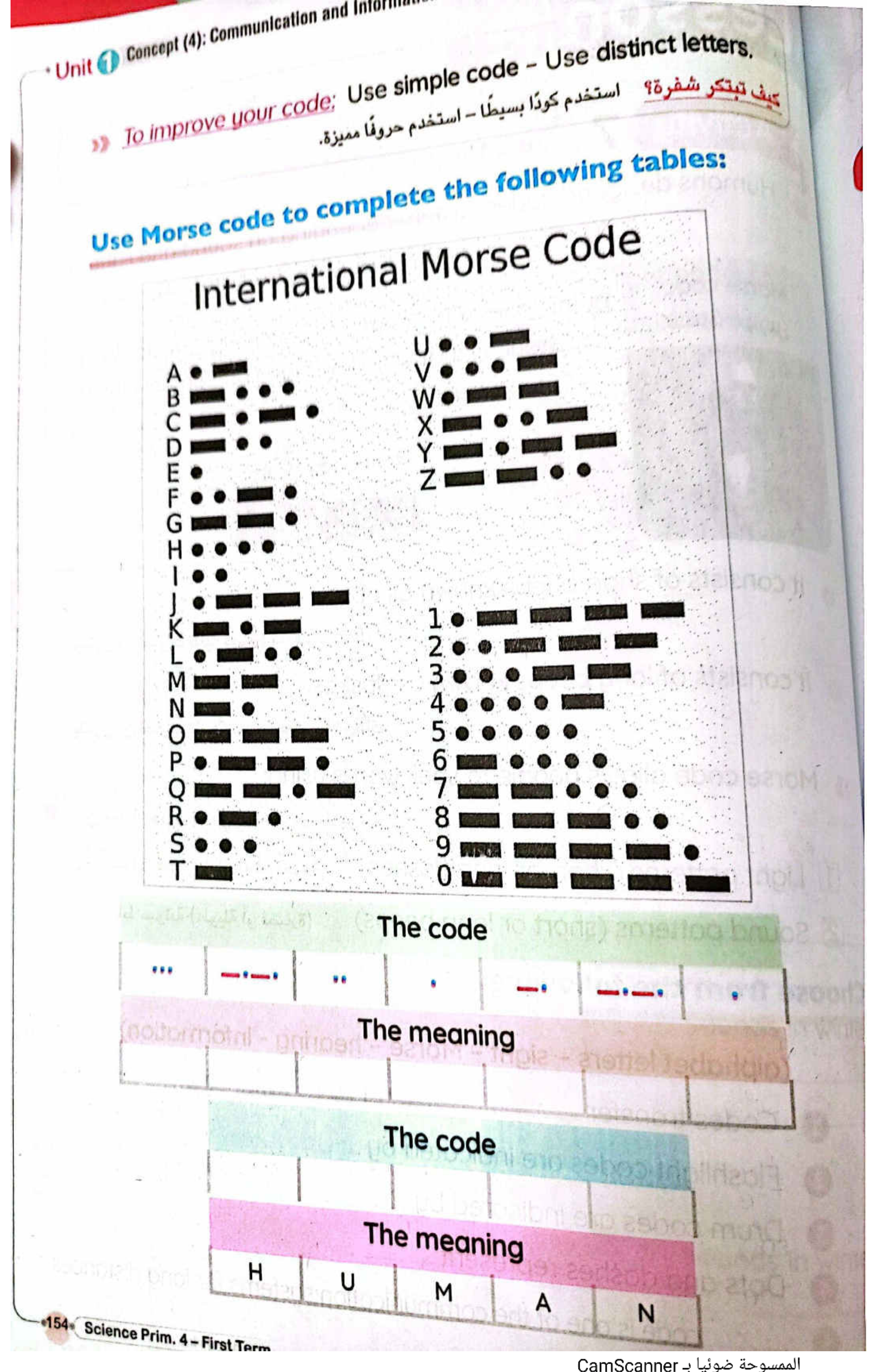
« تتيح شفرة مورس تهجي الكلمات من طريق:

1. Light patterns (short or long flashes) (ومضات ضوئية (طويلة أو قصيرة
2. Sound patterns (short or long beeps) (أنماط صوتية (طويلة أو قصيرة

Choose from the following:

(alphabet letters - sight - Morse - hearing - information)

1. Codes transfer ....
2. Flashlight codes are indicated by ....
3. Drum codes are indicated by ....
4. Dots and dashes represent ....
5. .... code is one of the communication systems for long distances.



» *To improve your code:* Use simple code – Use distinct letters.

كيف تبتكر شفرة؟ استخدم كودًا بسيطًا – استخدم حروفًا مميزة.

Use Morse code to complete the following tables:

International Morse Code

A ·—
B —···
C —·—·
D —··
E ·
F ··—·
G ——·
H ····
I ··
J ·———
K —·—
L ·—··
M ——
N —·
O ———
P ·——·
Q ——·—
R ·—·
S ···
T —

U ··—
V ···—
W ·——
X —··—
Y —·——
Z ——··

1 ·————
2 ··———
3 ···——
4 ····—
5 ·····
6 —····
7 ——···
8 ———··
9 ————·
0 —————

The code						
···	—·—·	··	·	—·	—·—·	·
The meaning						

The code				
The meaning				
H	U	M	A	N





Choose the correct answer:

1. People used Morse code in the past to communicate through ....
   a. light patterns only
   b. sound patterns only
   c. light and sound patterns
   d. no corrects answer
2. Morse code is a communication system that is used by ....
   a. dolphins
   b. fireflies
   c. bats
   d. humans
3. Morse code consists of short beeps known as ....
   a. dots
   b. dashes
   c. symbols
   d. drawing
4. Morse code consists of long beeps known as ....
   a. dots
   b. dashes
   c. symbols
   d. drawing
5. Dots and dashes in Morse code represent ....
   a. map drawing
   b. numbers
   c. alphabet letters
   d. weather
6. Morse code depends on .... energy(ies).
   a. sound only
   b. light only
   c. heat only
   d. sound and light
7. Drum code is indicated by .... sense, while flashlight code is indicated by ....
   a. sight - hearing
   b. hearing - sight
   c. touch - smell
   d. hearing - touch

Write the scientific term:

1. One of the communication systems that are used by humans. (........)
2. The season during which humpback whales sing high-pitched sounds. (........)
3. The season during which humpback whales sing low-pitched sounds. (........)

4. A pattern that has meaning and allows people to communicate. (..................)

5. The system that is responsible for processing all codes. (..................)

3 Put (✓) or (✗):

1. Morse code is used by humans to communicate across long distances. (   )
2. Long beeps in Morse code are represented by dots. (   )
3. Dashes and dots in Morse code can be represented by flashlight patterns. (   )
4. Morse code can be detected by sight sense or hearing sense. (   )
5. To improve your code, you have to use distinct letters. (   )

4 Complete the following sentences:

1. .... code was designed by Samuel Morse and is used to transfer .... for .... distances among ....
2. Short beeps in Morse code are represented by ...., while long beeps in Morse code are represented by ....
3. Dots and dashes represent ....
4. Flashlight code can be detected by .... sense, while drum code can be detected by .... sense.
5. To improve your code, you must use .... code and .... letters.

5 Classify the following according to the type of communication:

Dolphins - Fireflies - Humans - Bats

Morse Code	Echolocation	Light Show
....	....	....

Activity 8 Animals Communicate with Movement

1 Communication among honeybees التواصل بين النحل

» Honeybees live in hives.

» Honeybees use a movement (special dance) to communicate together while searching for food and water sources.

« يتواصل النحل معًا عن طريق بعض الحركات أثناء البحث عن مصادر المياه والغذاء.

« يعيش النحل داخل الخلية.



The scout bee moves in a figure eight pattern by vibrating its wings.

« تدور النحلة (الكشاف المتطوع) على شكل نمط يشبه رقم 8 مع اهتزاز جناحيها.

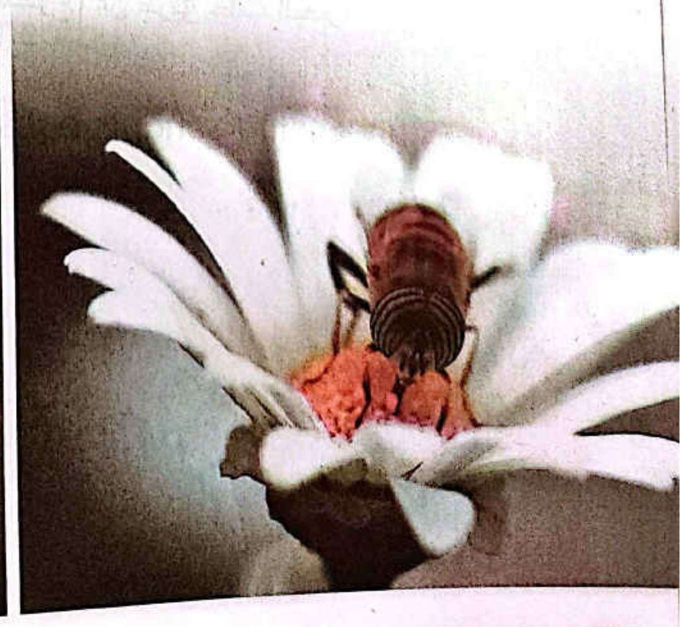
This movement (dance) tells other bees about the direction and distance of food.

« تخبر تلك الحركة (الرقصة) باقي النحل بالاتجاه الصحيح للحصول على الغذاء.

Other bees in the hive interpret this dance, by using their sight sense, then fly to a specific location.

« يترجم النحل في الخلية تلك الحركة (الرقصة) عن طريق حاسة البصر ويطير للموقع المحدد.





Coding with Honeybees تشفير حركة النحل

» When the scout bee faces the flower.

If the flower was

Very close

» The bee does one round dance.

ترقص النحلة رقصة واحدة إذا كانت الزهرة قريبة.

Far away

» The bee does three or more dances (waggle dance).

ترقص النحلة عدة مرات إذا كانت الزهرة بعيدة.

» Other bees receive the code from scout bees using their sense of sight.

« يترجم النحل في الخلية حركة النحلة (الكشاف المتطوع) عن طريق حاسة البصر.

» **Codes are useful for honeybees** because they can't talk like humans.

« تلك الشفرة مفيدة جدًا للنحل لأنها لا تستطيع الكلام.



Activity 9 Optional Activity

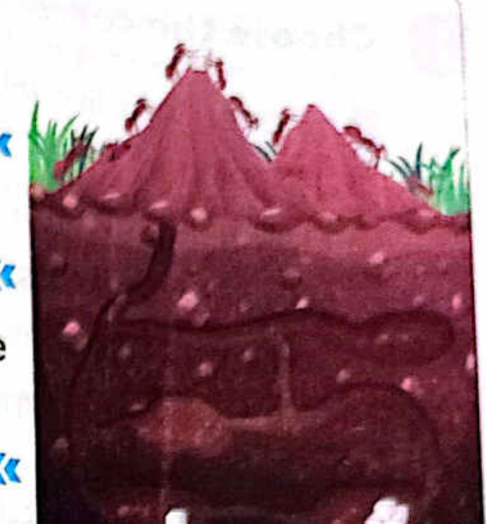
Communication Systems





Activity 10 How Animals Use Communication Systems

3 Communication among ants التواصل بين النمل



- Ants live in colonies that contain thousands of individuals.

  يعيش النمل في مستعمرات بها آلاف الأفراد.

- Each group of ants does a specific role.

  كل مجموعة من النمل لها دور معين تقوم به.

- Ants use the smell sense to communicate together in case of lack of food.

  يستخدم النمل حاسة الشم للتواصل بينها في حالة نقص الغذاء.

- Nurse ants send strong smelly messages to scout ants if food is low.

  عند نقص الطعام تطلق عاملات النمل رائحة قوية لتنبه النملة (الكشافة) بالبحث عن الطعام.

- Scout ants respond by sending smelly messages to other ants to search for food.

  تقوم النملة (الكشافة) بالبحث بإطلاق رائحة قوية لتنبه باقي النمل بالبحث عن الطعام.

- Soldiers ants (protect colony from dangers)

  Send smelly messages if danger is nearby

  يتواصل جنود النمل معًا بإطلاق الروائح في حالة وجود خطر.







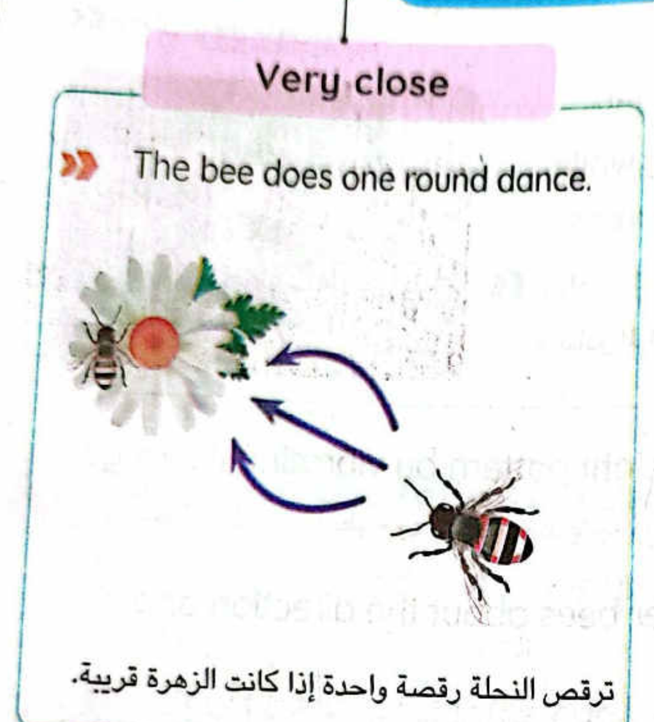
Coding with Honeybees تشفير حركة النحل

» When the scout bee faces the flower.

If the flower was

Very close

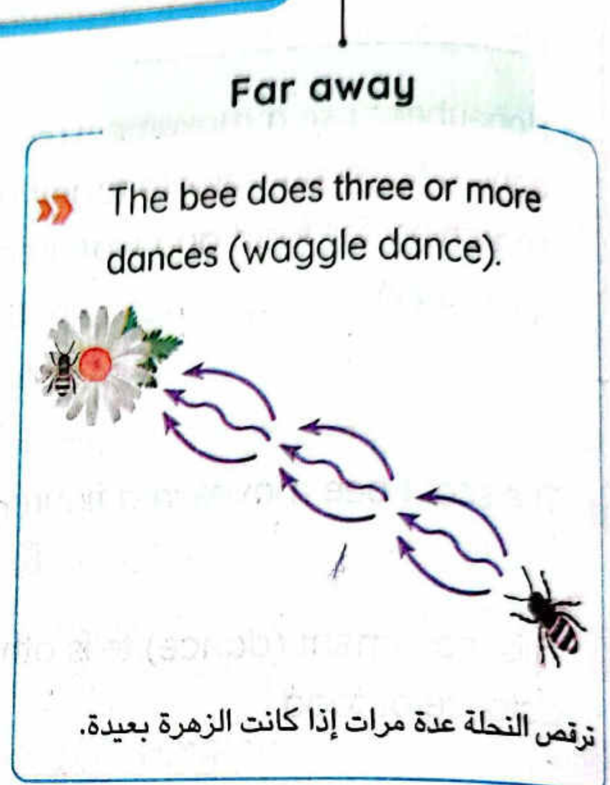
» The bee does one round dance.



ترقص النحلة رقصة واحدة إذا كانت الزهرة قريبة.

Far away

» The bee does three or more dances (waggle dance).



ترقص النحلة عدة مرات إذا كانت الزهرة بعيدة.

» Other bees receive the code from scout bees using their sense of sight.

« يترجم النحل في الخلية حركة النحلة (الكشاف المتطوع) عن طريق حاسة البصر.

» Codes are useful for honeybees because they can't talk like humans.

« تلك الشفرة مفيدة جدًا للنحل لأنها لا تستطيع الكلام.







Activity 10 How Animals Use Communication Systems

3 Communication among ants التواصل بين النمل



- Ants live in colonies that contain thousands of individuals.
  - يعيش النمل في مستعمرات بها آلاف الأفراد.
- Each group of ants does a specific role.
  - كل مجموعة من النمل لها دور معين تقوم به.
- Ants use the smell sense to communicate together in case of lack of food.
  - يستخدم النمل حاسة الشم للتواصل بينها في حالة نقص الغذاء.

- Nurse ants send strong smelly messages to scout ants if food is low.
  - عند نقص الطعام تطلق عاملات النمل رائحة قوية لتنبه النملة (الكشافة) بالبحث عن الطعام.



- Scout ants respond by sending smelly messages to other ants to search for food.
  - تقوم النملة (الكشافة) بالبحث بإطلاق رائحة قوية لتنبه باقي النمل بالبحث عن الطعام.



- Soldiers ants (protect colony from dangers)

  Send smelly messages if danger is nearby
  - يتواصل جنود النمل معًا بإطلاق الروائح في حالة وجود خطر.







1 Choose the correct answer:

1. Honeybees live in ....
   a. colonies b. hives c. nests d. caves
2. Honeybees communicate together using ....
   a. sound patterns b. light patterns
   c. motion patterns d. smelling
3. Honeybees communicate together in order to ....
   a. attract a mate b. sneak up on the prey
   c. avoid predators d. search for food
4. Scout bees rotate in the form of number .... to direct other bees to the direction of food.
   a. 6 b. 8 c. 9 d. 0
5. If a flower was very close to a scout bee, the scout bee would do ....
   a. one round dance b. two round dances
   c. one oval dance d. a waggle dance
6. Bees in their hives can detect the motion of scout bees using their .... sense.
   a. hearing b. sight c. smell d. touch
7. Ants live in .... that are composed of thousands of individuals.
   a. colonies b. hives c. nests d. caves
8. Ants communicate together using ....
   a. sound patterns b. light patterns
   c. motion patterns d. smelling sense
9. Nurse ants send smelly messages to scout ants in the case of ....
   a. mating season b. a danger nearby
   c. lack of food d. attracting a mate

10. .... are responsible for searching for the food resources.
a. Nurse ants
b. Scout ants
c. Solider ants
d. Queen ants

11. Solider ants send smelly messages to other ants in the case of ......
a. mating season
b. a danger nearby
c. lack of food
d. lack of water

2 Write the scientific term:

1. The way of communication among honeybees. (..........)
2. Honeybees that are responsible for searching for food resources. (..........)
3. The sense that helps honeybees to translate scout bee motion. (..........)
4. The sense that helps ants to communicate. (..........)
5. Ants that are responsible for sending smelly messages in the case of a lack of food. (..........)
6. Ants that are responsible for searching for food resources. (..........)
7. Ants that are responsible for protecting the colony from any danger. (..........)

3 Put (✓) or (✗):

1. Honeybees live in hives, while ants live in nests. (   )
2. Bees communicate together using motion patterns. (   )
3. Honeybees communicate to sneak up on the prey together. (   )
4. Other bees in hives use smelling sense to locate the direction of food. (   )
5. The dance of a scout bee tells other bees about the direction of food. (   )
6. Scout bees move in the form of a 3 pattern when they find food. (   )
7. If the food is far away from a scout bee, so it does a waggle dance. (   )
8. Codes are very useful for bees and ants because they can't talk like humans. (   )

9. In the colony, all ants work together to find food and protect the colony. ( )
10. Scout ants send smelly messages to nurse ants in case of the lack of food. ( )
11. Solider ants protect the colony from any danger nearby. ( )

4 Complete the following sentences:

1. Honeybees live in ...., while .... live in colonies.
2. Honeybees communicate together using .... pattern while searching for .... and .... resources.
3. The scout bee moves in the figure of .... pattern by vibrating its wings.
4. Other bees in the hives interpret the dance of .... bee, by using .... sense.
5. If the food is near to a scout bee so it does .... dance, while if the food is very far, it does .... dances.
6. Ants use .... sense to communicate together in the case of ....
7. .... ants send smelly messages to .... ants if the food isn't enough.
8. .... ants are responsible for searching for food, while .... ants protect the colony from any danger nearby.

5 Classify the following according to the sense that the living organism uses to communicate and survive:

Dolphins – Fireflies – Snakes – Honeybees – Panther chameleons – Ants – Bats – Egyptian mongooses

Sight	Hearing	Smell	Touch	Taste
....	....	....	....	....
....	....	....	....	....

6 Choose from column (A) what suits it in column (B):

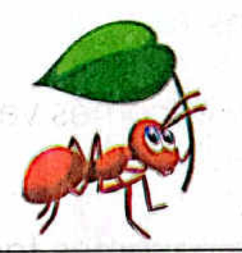
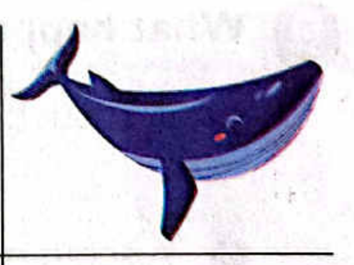
Column (A)	Column (B)
1 Scout bees	a. sing a wide range of tones to communicate.
2 Scout ants	b. light up their wings to warn off predators nearby.
3 Nurse ants	c. do a waggle dance if the food is far away.
4 Solider ants	d. search for food resources outside colony.
5 Fireflies	e. protect the colony from any danger.
6 Humpback whales	f. send smelly messages to scout ants due to a lack of food.

1 .... 2 .... 3 ....

4 .... 5 .... 6 ....

7 Study the following figures, then answer the questions:

1 The following figures represent different living organisms:

			
Figure (1)	Figure (2)	Figure (3)	Figure (4)

a. Figure (......) represents the insect that lives in hives.

b. Figure (......) represents the insect that lives in colonies.

c. Figure (......) uses its smelling sense to communicate together.

d. Figure (......) uses its hearing sense to communicate together.

e. Figures (......) & (......) use sight sense to communicate together.

f. Figure (......) communicates by movement patterns.

2. The opposite figure represents a scout bee:
   a. If the flower is very close to the bee, it does .... dance.
   b. If the flower is far away from the bee, it does .... dances.
   c. Other bees in the hive .... this dance by using their .... sense.

8 Give reasons for:

1. The scout bee moves in figure eight pattern by vibrating its wings.

   ....

2. Movement codes are useful for honeybees.

   ....

3. Nurse ants send strong smelly messages to scout ants.

   ....

4. Scout ants respond by sending smelly messages to other ants

   ....

5. Soldier ants send smelly messages to other ants.

   ....

9 What happens if:

1. A scout bee becomes very close to a flower.

   ....

2. A scout bee becomes far away from the flower.

   ....

3. The amount of food in a colony of ants decreases.

   ....

4. A danger becomes close to the colony of ants.

   ....

Lesson 5

Activity 11 Record Evidence Like a Scientist

Examples of Communication Between Animals
أمثلة للتواصل بين الحيوانات

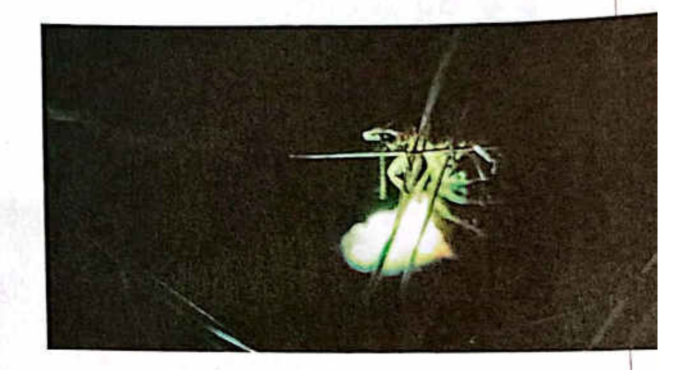
» **Humpback whales:**

Sing tones under water to communicate with each other.



» **Fireflies:**

Emit light & their wings flash to warn off predators or attract a mate.



» **Bees:**

Communicate using motion patterns to search for food and water sources.



» **Ants:**

Use their smell sense to communicate together in case of the lack of food.

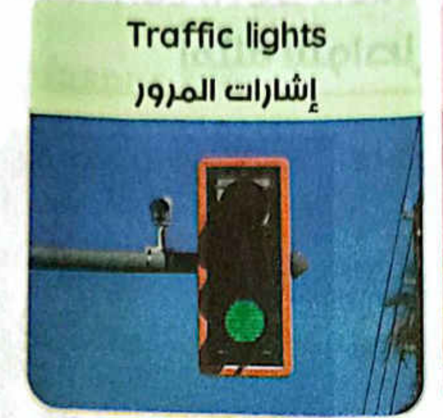




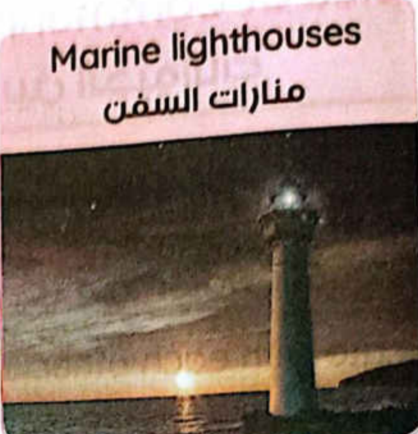
Examples of Communication Between Humans
أمثلة للتواصل بين البشر

1 By light:

Traffic lights
إشارات المرور



Marine lighthouses
منارات السفن



2 By sound:

Drums
الطبول



Languages
اللغات



3 Communication systems:

Cell phone
الهاتف الخلوي



Internet
الإنترنت



TV
التلفاز





4 Codes:



Morse code
شفرة مورس

Activity 12 STEM in Action

Many animals, such as bats use sound to communicate & to locate objects.

Technology Inspired by Nature
تكنولوجيا مستوحاة من الطبيعة

Bats الخفافيش



1. Bats produce high-pitched sounds.
   - يصدر الخفاش أصواتًا عالية التردد.
2. Bats use their strong hearing sense to locate reflected sound (echo) from bodies nearby them.
   - تستخدم الخفافيش حاسة السمع القوية لتحديد موقع الأشياء في الظلام عن طريق ارتداد صدى الصوت.

Cane العكاز



Scientists created a special cane to help blind people detect their surroundings.

ابتكر العلماء عكازًا لمساعدة المكفوفين لتحديد موقع الأشياء المحيطة بهم.

How does a blind person use it?



1. The cane emits a high-pitched sound.
2. Echo is turned into vibration that a person can feel by his thumb.
3. These vibrations tell the person about any nearby bodies.

يصدر العكاز صوتًا عالي التردد.

يتحول صدى الصوت لاهتزازات يشعر بها الشخص بإبهامه.

تُخبر تلك الاهتزازات الشخص بالأجسام من حوله.

Similarities between bats and the cane

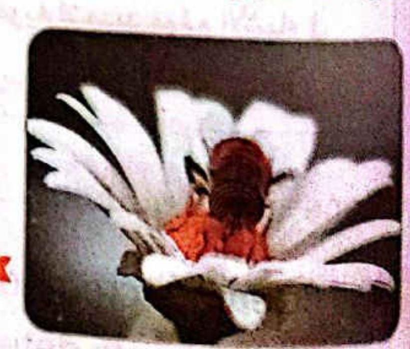
- Both of them produce a high-pitched sounds.
- Both of them depend on echo to locate things.

كلاهما يصدر صوتًا عالي التردد - كلاهما يستخدم خاصية تحديد الموقع بصدى الصوت.

Differences between bats and the cane

- The cane changes echo into vibrations. يحول العكاز صدى الصوت لاهتزازات.
- Bats can't change echo into vibrations. لا يحول الخفاش صدى الصوت لاهتزازات.
- A blind person detects echo using touch. الشخص المكفوف يلتقط صدى الصوت عن طريق حاسة اللمس.
- Bats detect echo by hearing. الخفاش يلتقط صدى الصوت عن طريق حاسة السمع.

Honeybees



- Make a series of vibrations and movements to tell other bees about the location of food resources.

تقوم بسلسلة من الحركات والاهتزازات لتخبر باقي النحل بالاتجاه الصحيح للحصول على الغذاء.

Activity 13 Optional Activity
Evaluate Like a Scientist



1 Choose the correct answer:

1. .... is a property used by dolphins and bats to locate their prey.
   a. Countershading b. Camouflage
   c. Echolocation d. Aestivation
2. Bats and the cane produce .... pitched sounds.
   a. very low b. low c. medium d. high
3. All of the following use the echolocation property to locate things, except ....
   a. blind people b. bats c. honeybees d. dolphins
4. Both .... and .... make series of vibrations.
   a. bats and honeybees b. canes and bats
   c. honeybees and fireflies d. canes and honeybees
5. .... can change echo to vibrations.
   a. Bats b. Canes c. Dolphins d. Honeybees
6. Bats use their strong .... sense to detect echo.
   a. sight b. smell c. hearing d. touch
7. Blind people use .... sense to pick up echoes through the cane.
   a. hearing b. sight c. smell d. touch
8. Blind people can't use their .... sense.
   a. hearing b. sight c. smell d. touch
9. Both bats and the special cane ....
   a. can change echo to vibration b. can't change echo to vibration
   c. produce high-pitched sounds d. detect echo using hearing sense

2 Write the scientific term:

1. A property used by dolphins to locate their prey in dark water. (........)
2. A living organism that uses echo to locate its prey in the air. (........)

3. The sense used by the blind person to detect echo. (................)
4. The sense used by bats to detect echo and locate their prey. (................)
5. A special device used by the blind person to locate things nearby. (................)
6. A living organism that makes vibrations with its wings to direct the others to the food resources. (................)

3 Put (✓) or (✗):

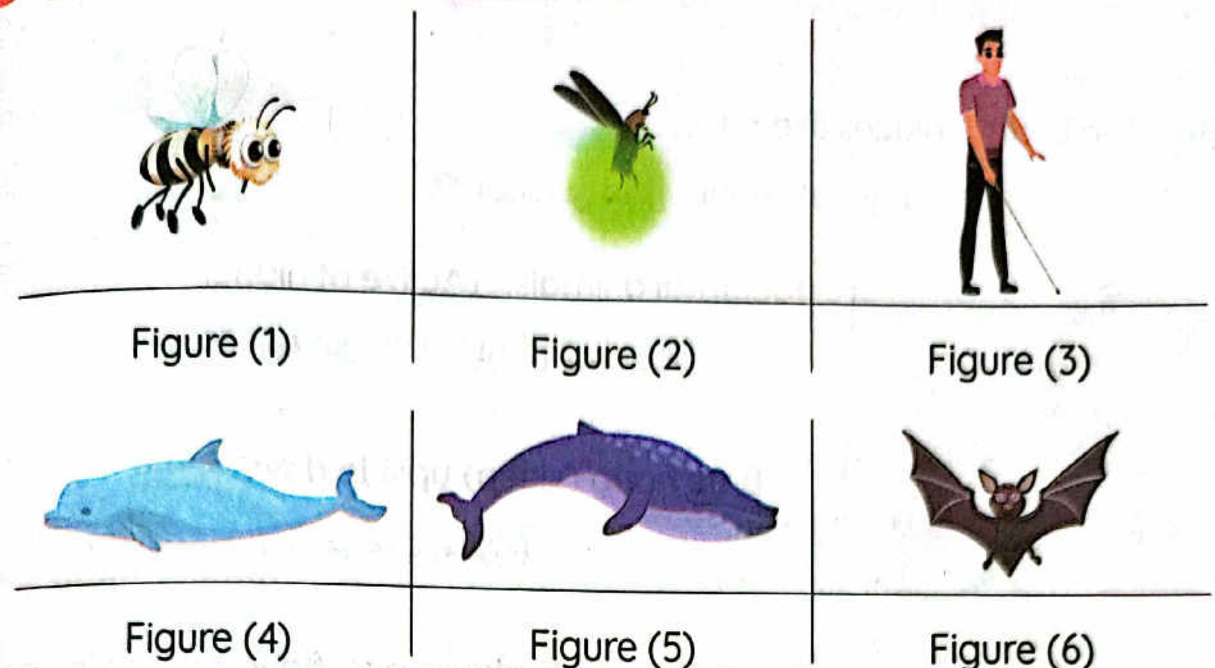
1. The special cane emits low-pitched sounds. (   )
2. Bats can't change echo into vibrations. (   )
3. A blind person uses his strong sense of hearing to listen to the reflected echo. (   )
4. The special cane that can help deaf people to locate things. (   )
5. Without the strong sense of hearing, bats will die. (   )
6. Honeybees make a series of movements and vibrations to attract a mate. (   )
7. Bats, dolphins and fireflies depend on echo. (   )
8. Bats, whales and dolphins use sound energy to communicate. (   )

4 Complete the following sentences:

1. Bats produce .... pitched sound then they use their strong .... sense to detect the ....
2. Scientists designed a .... for .... people to help them detect their surroundings.
3. .... , ... and .... use echo to locate things.
4. Humpback whales produce .... pitched sound in summer, while bats always produce .... pitched sound.
5. Humpback whales use .... energy to communicate, while fireflies use .... energy.
6. .... can change echo to vibrations.
7. The echo is turned into vibrations that a person can feel using his ....
8. Honeybees make a series of .... and .... to tell other bees about the location of .... resources.



5 Study the following figures, then complete the questions:



a. Figures (.......), (.......) & (.......) use echo to detect surroundings or to hunt.

b. Figures (.......), (.......) & (.......) use sound energy to communicate together.

c. Figure (.......) uses light energy to communicate together.

d. Figure (.......) uses motion patterns to communicate together.

e. Figure (.......) produces high-pitched sounds in winter and low-pitched sounds in summer.

f. Figure (.......) uses its sense of touch to detect echo.

6 Give reasons for:

1. Echo turns into vibrations in the cane of a blind person.

   ....

2. There are similarities and differences between a bat and the cane.

   ....

3. Honeybees make a series of vibrations and movements.

   ....

7 What happens if:

1. The cane of a blind person picks up echo.

   ....

2. The sound waves produced by a bat hits an insect.

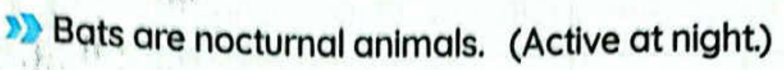
   ....

Project



» Bats live in dark places like caves.

« الخفافيش تعيش في الكهوف (الأماكن المظلمة).





» Bats are nocturnal animals. (Active at night.)

« الخفافيش كائنات ليلية أي تنشط في الليل.



» Bats hang (sleep) upside down.

« تنام الخفافيش رأسًا على عقب (مقلوبة).

Bats
الخفافيش



» Bats help plants and flowers such as bees and butterflies.

« الخفافيش تعمل على مساعدة النباتات مثل النحل والفراشات.

» Bats can fly fast like birds.

« الخفافيش تستطيع الطيران بسرعة كالطيور.

» Most bats eat insects, such as mosquitoes.

« الخفافيش تأكل الحشرات مثل البعوض.

How bats locate things in dark
كيف تحدد الخفافيش موقع الأشياء في الظلام؟

Bats use a **property** known as "**echolocation**" to locate their prey and hunt in total darkness.

تستخدم الخفافيش خاصية تحديد الموقع بصدى الصوت لتحديد مواقع الفرائس في الظلام.

How bats locate things:

1. Bats produce high-pitched sound waves through air.
   يقوم الخفاش بإرسال موجات صوتية في الهواء.
2. When these waves hit any object, it returns back to the bat.
   عندما ترتطم الموجات بأي جسم فإنها ترتد إلى الخفاش فيستطيع تحديد موقع الفريسة.

SINAI BLUE AGAMA LIZARD



Habitat:

Desert (hot and dry climate)

How do they survive in a hot and dry climate?

1. They save their energy by finding shaded areas between rocks and when the prey comes nearby, they can attack them.

تقوم السحالي بتوفير طاقتها من خلال الانتظار في مناطق الظل بين الصخور وعندما تأتي الفرائس بالقرب منها يمكنها مهاجمتها.

2. They stand on the top of their toes, so their belly stays high above the hot rocks.

تقف على قمة أصابع قدمها، مما يبقي بطنها عاليًا فوق الصخور الساخنة

The number of Sinai agama lizard is decreaseing.

Because they are affected by human activities such as:

1. Catching them to be sold as pets.

اصطيادها لبيعها كحيوانات أليفة



They have long and thin bodies that help them run fast and climb rocks.

لها جسم طويل ورفيع يساعدها على الجري بسرعة وتسلق الصخور.

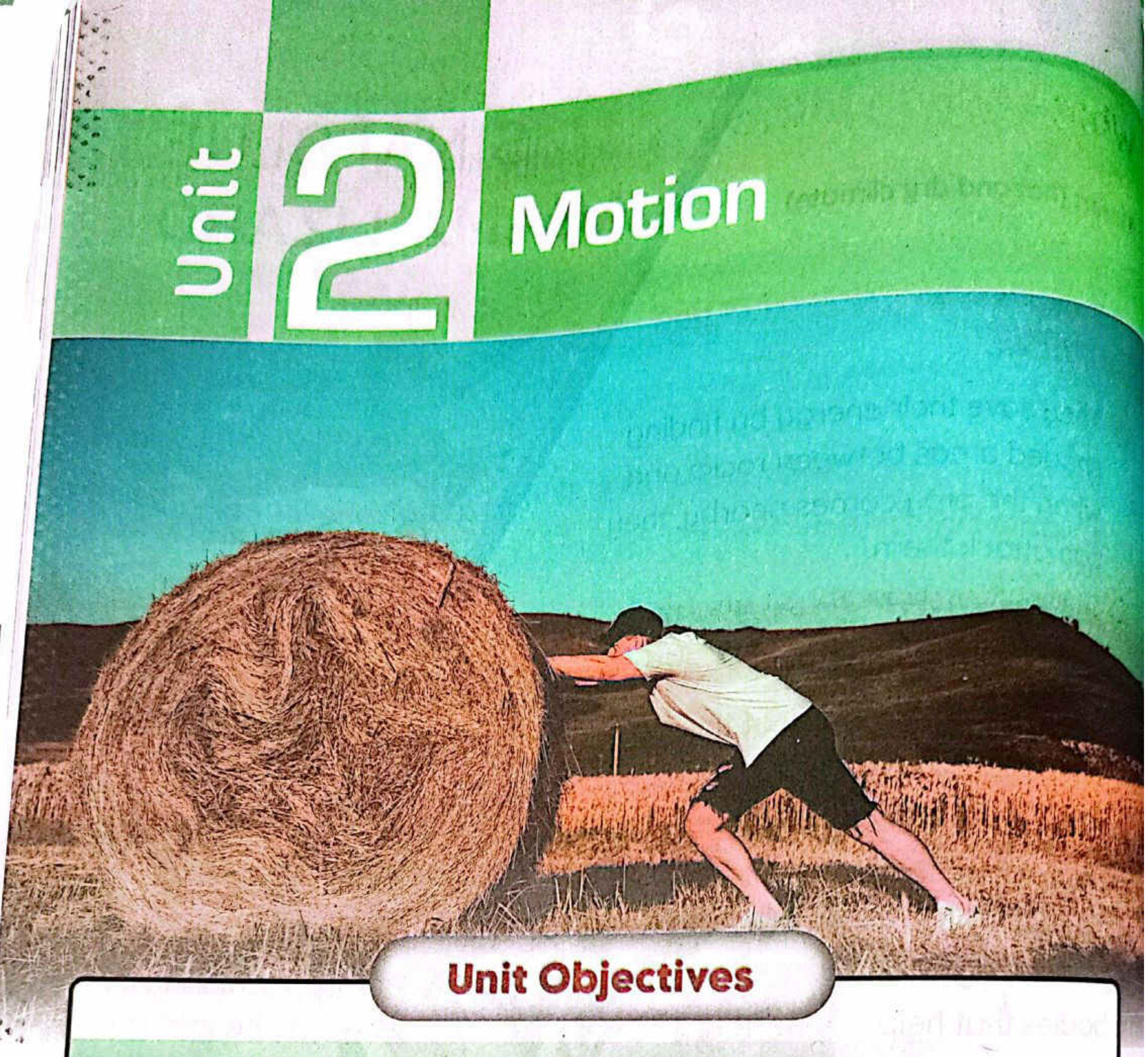
They feed on ants, beetles, grasshoppers and other insects.

تتغذى على النمل والخنافس ونطاط العشب والحشرات.

2. Changing their natural habitat by building roads and sidewalks.

تغيير بيئتها الطبيعية عن طريق شق الطرق وبناء الأرصفة

Unit 2 Motion



Unit Objectives

In this unit, you will learn about:

1. The relationship between force and an object's motion.
2. Starting and stopping of objects.
3. How energy changes when a force is applied on an object.
4. The relationship between energy and work.
5. Investigating the speed of a moving object.
6. Investigating what happens when objects collide.

Get Started
What I Already Know





- In this unit, we are going to discuss the relationship between energy and motion.
- Think about all things that move around you. Do these objects move at the same speed?

Relation Between Energy and Motion

- Static objects move when a proper force acts on them.
- For example, a static ball remains static until a player kicks it or the wind moves it.

Example:

- **Look at this figure of a man sitting in a wheelchair at the top of a ramp.**

While moving down	The wheels of the chair help the man to roll down the ramp.
While moving up	The man needs to exert more force to overcome the force of gravity.



- If the ramp is not smooth, the man will need to exert more force to move.

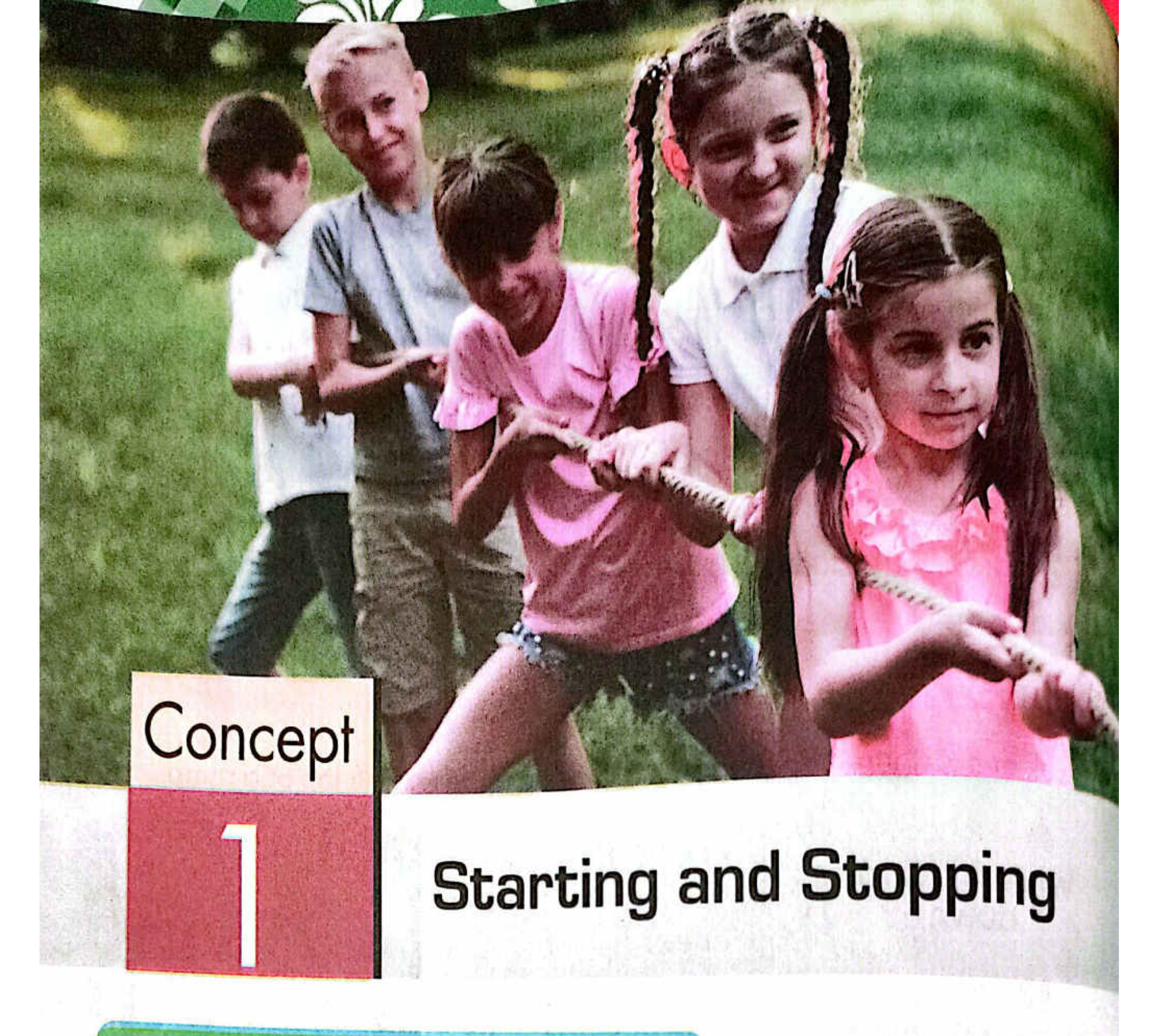
Motion of Cars and Trains

- Objects, such as trains and cars, need a source of energy to move, such as fuel, electricity and solar energy.
- Heavy objects, such as trains, need more fuel than light objects, such as cars.

Science and Car Collisions

- During collision, a lot of things happen. We hear noise and objects get damaged.
- Modern cars are designed with a lot of safety equipment, such as seatbelts and airbags to reduce the negative effects of collision on the driver or the passengers.





Concept 1

Starting and Stopping

In this concept, we are going to study:

- The force causing an object to move or stop.
- Pushing and pulling forces.
- Balanced and unbalanced forces.
- Air (Wind) force.
- Gravity.
- Stopping a moving object:
  - a. Collision
  - b. Friction force
- Relationship between force, energy and work.

Key Vocabulary

- Energy
- Force
- Gravity
- Motion
- Friction
- Work

Lesson 1

Activity 1 Can You Explain?

» An object stays *static* when it doesn't change its position.



Because there is no force acting on it.

» يظل الجسم ساكنًا (لا يغير موضعه) لعدم وجود قوة تؤثر عليه.

» An object *moves* when it changes its position.



Because there is a force acting on it.

» يتحرك الجسم (يغير موضعه) لوجود قوة مناسبة تؤثر عليه.

» Force causes the motion of objects.

Are these objects static or in motion ?



....



....



....

 The player needs energy to push the ball.

 The boy needs energy to pull the bag.



Activity 2 Truck Versus Airplane



Truck Versus Airplane
مقارنة بين الشاحنات والطائرات



» A jet airplane is much faster than a truck.
Because the jet's engine is much more powerful than the truck's engine.

« تطير الطائرة بسرعة أكبر من الشاحنة لأن محرك الطائرة أقوى بكثير من محرك الشاحنة.

Shockwave
(World's Fastest Truck) أسرع شاحنة في العالم

- It was fitted with three jet engines.
- تم تزويد تلك الشاحنة بـ ٣ محركات لطائرة نفاثة.
- Its speed can reach 500 kilometers per hour.
- تصل سرعة تلك الشاحنة لـ ٥٠٠ كم في الساعة.
- It is five times faster than a normal truck.
- تلك الشاحنة أسرع من الشاحنة العادية بـ ٥ مرات.



How It Moves

» It moves and reaches record speeds using the pushing force of its powerful engines.

« تتحرك الشاحنة وتسجل سرعات قياسية باستخدام قوة دفع المحرك.



How It Stops
(As with Rockets)

» Engineers installed three parachutes that help the driver to slow down the truck.

« قام المهندسون بتركيب ٣ مظلات يفتحها السائق لإبطاء الشاحنة بشكل أسرع.





1 Choose the correct answer:

1. We can say that an object is in a state of motion when its ______ changes.
   a. shape b. size c. color d. position
2. A static object needs ______ .
   a. force to stop it b. speed to move it
   c. energy to stop it d. force to move it
3. To open the refrigerator door, we use ______ force.
   a. friction b. gravitational
   c. pulling d. pushing
4. To open these two doors in the following figure, door (A) needs ______ force, while door (B) needs ______ force.
   Door (B) Door (A)
   a. pushing – pushing b. pushing – pulling
   c. pulling – pulling d. pulling – pushing
5. Moving a box away from you represents ______ force.
   a. magnetic b. gravitational c. pulling d. pushing
6. Pushing and pulling forces are different in ______ .
   a. mass b. color c. direction d. energy
7. All the following are faster than a normal truck, except a ______ .
   a. rocket b. normal vehicle
   c. Shockwave truck d. jet airplane
8. A jet airplane is faster than a normal truck because ______ .
   a. the jet airplane is heavier than the normal truck
   b. the jet airplane can fly while the normal truck can't
   c. the jet airplane has a more powerful engine than a truck
   d. the jet airplane is bigger than the normal truck.
9. A Shockwave truck is fitted with ______ jet engines, which make it the fastest truck in the world.
   a. two b. three c. four d. five

10. A Shockwave truck is ______ times faster than any other truck.
    a. two b. three c. four d. five
11. Three parachutes help the driver of the Shockwave truck to ______.
    a. increase its speed
    b. decrease its speed
    c. change its direction
    d. change its position
12. Shockwave trucks record a high speed using the ______ force of its engines.
    a. electric b. magnetic c. pushing d. pulling

2 Write the scientific term:

1. An object that doesn't change its position. (______)
2. The force that a football player needs to kick the ball. (______)
3. The force that moves an object toward you. (______)
4. The fastest truck in the world. (______)
5. The force of a truck's engine that helps it to move. (______)
6. A tool used to decrease the speed of the Shockwave truck. (______)

3 Put (✓) or (✗):

1. The speed of a static object becomes zero when a force acts on it. ( )
2. A moving object toward you is considered a pushing force. ( )
3. The player needs pushing force to hit the tennis ball. ( )
4. Doors can only be opened using pushing force. ( )
5. Modern cars have more powerful engines than normal trucks. ( )
6. Jet airplanes are slower than rockets and faster than normal trucks. ( )
7. Shockwave trucks are faster than rockets. ( )
8. The Shockwave truck is fitted with three jet engines and three parachutes. ( )
9. Parachutes are used in Shockwave trucks and rockets. ( )
10. Parachutes help the driver to jump quickly from the Shockwave truck during landing

4 Complete the following sentences:

1. To open a closed door, we have to .... or .... it.
2. An object stays .... until a .... acts on it to change its ....
3. The speed of a static object equals zero because the object doesn't change its ....
4. A girl needs .... to pull the bag.
5. .... force means that the object is moving away from you.
6. .... force of .... helps a Shockwave truck to start moving.
7. The engine of a jet airplane is .... powerful than a normal truck.
8. A Shockwave truck is faster than .... and slower than ....
9. A Shockwave truck is fitted with .... jet engines, which make it .... times faster than any normal truck.
10. .... are used to slow down and stop the Shockwave truck.

5 Cross out the odd word:

1. Push – Pull – Force – Time
2. Lifting a bag - Kicking a ball- Catching ball
3. Truck engine – Pulling force – Pushing force
4. Parachutes – Rocket – Normal truck – Shockwave truck

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Shockwave trucks	a. are slower than jet airplanes and faster than rockets.
2. Normal trucks	b. help to decrease the speed of Shockwave trucks.
3. Parachutes	c. are slower than rockets and faster than normal trucks.
4. Jet engines	d. help to start moving Shockwave trucks.
	e. are slower than jet airplanes and faster than modern cars.

1. .... 2. .... 3. .... 4. ....

7 Study the following figures, then complete:

Figure (1)	Figure (2)	Figure (3)	Figure (4)

1. Figure (........) is the fastest moving object, while figure (........) is the slowest object.
2. Figure (........) represents the fastest truck in the world.
3. Parachutes are used in figures (........) and (........) to decrease their speed.
4. Figures (........) and (........) use the same kind of engine.

8 Study the following figures, then mention the kind of force:

Figure	1	2	3	4
(Pushing or Pulling) Force				

9 Give reasons for:

1. Pushing and pulling forces are different in direction.
....
2. Kicking a ball is done by a pushing force.
....
3. Lifting a bag is done by a pulling force.
....
4. Jet airplanes are faster than normal trucks.
....
5. The Shockwave truck is the fastest truck in the world.
....
6. Parachutes are fitted to the Shockwave truck.
....

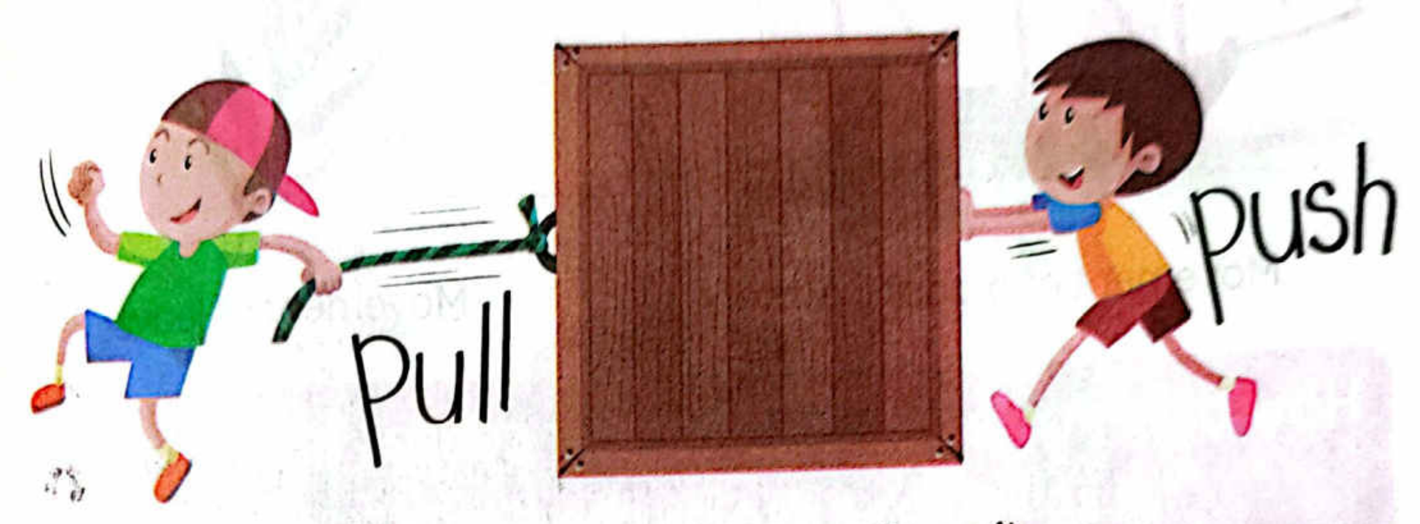
10 What happens if:

1. A pushing or pulling force acts on a static object.
....
2. The driver of a Shockwave truck opens the parachutes.
....

Activity 3 Making Things Move

» An object moves when a pushing or pulling force acts on it.

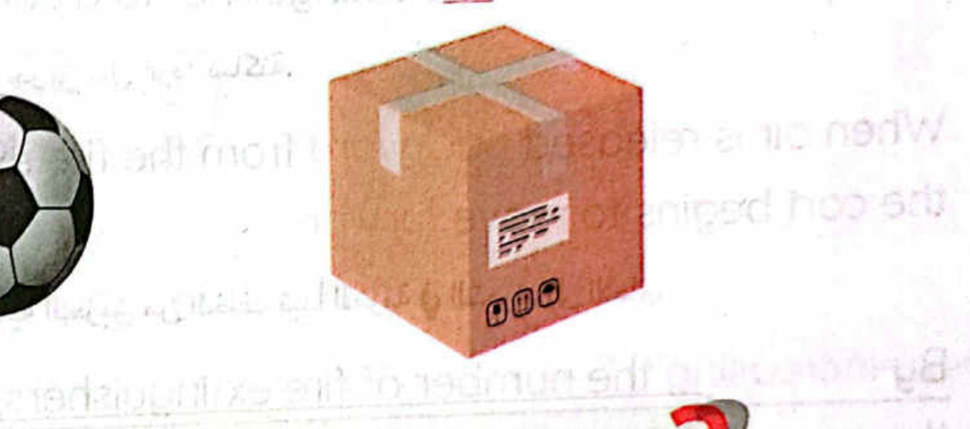
« يتحرك الجسم عندما تؤثر عليه قوة دفع أو سحب مناسبة.



» An object doesn't move when no force acts on it.

« لا يتحرك الجسم عندما لا تؤثر عليه قوة مناسبة.







Are these objects static or in motion?

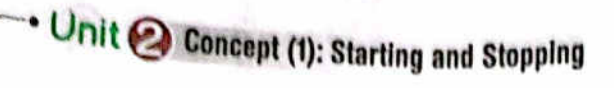








....

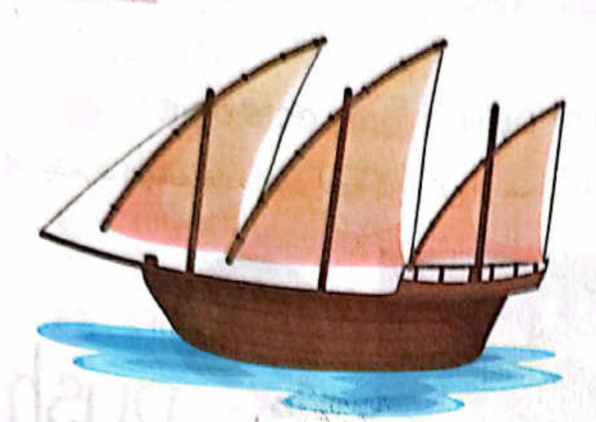




Air (wind) Force
قوة دفع الهواء

→ **Can move some objects.**
قد تحرك بعض الأجسام

Examples:



Movement of a boat in water



Movement of leaves

How did engineers prove that air causes movement?
كيف أثبت المهندسون أن الهواء قد يحرك الأجسام؟

- Engineers attached a fire extinguisher to a cart.
- قام المهندسون بتثبيت طفاية حريق على عربة ساكنة.
- When air is released backward from the fire extinguisher, the cart begins to move forward.
- عندما تنبعث الغازات من طفاية الحريق من الخلف تبدأ العربة في التحرك إلى الأمام.
- By increasing the number of fire extinguishers, the speed of the car increases and it covers a longer distance.
- عند زيادة عدد طفايات الحريق تصبح السيارة أسرع وتقطع مسافة أطول.







Activity 4 Making Things Move

1 When one force acts on an object:

Pulling Force
قوة السحب

- When an object moves toward you.

عندما يتحرك الجسم باتجاهك.

Pushing Force
قوة الدفع

- When an object moves away from you.

عندما يتحرك الجسم بعيدًا عنك.



We can use force to:

1. Move or stop an object.
2. Change an object's speed or direction.

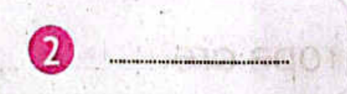
تستخدم القوة لتحريك أو إيقاف الجسم .. كما تستخدم لتغير سرعة الجسم أو تغير اتجاهه.

Pushing or pulling force ?

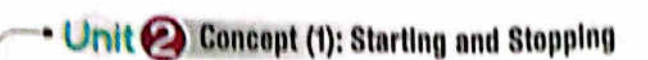








1. ....
2. ....
3. ....



2 When several forces act on an object:

Tug-of-War Game لعبة شد الحبل

Two teams pull the rope in the opposite directions.

Balanced Forces قوى متزنة	Unbalanced Forces قوى غير متزنة
The rope doesn't move. • When the forces that act on the rope are <u>equal</u>. الحبل لا يتحرك إذا أثرت عليه قوى متساوية.	The rope moves toward the greater force. • When the forces that act on the rope are <u>unequal</u>. الحبل يتحرك في اتجاه القوة الأكبر إذا أثرت عليه قوى غير متساوية.





Choose the correct answers:

(balanced - moves - doesn't move - unbalanced)



- The forces acting on the rope are ...., so the rope ....





1. The boy is holding a ball and standing beside a tree (starting position).
2. The boy throws the ball, so the pushing force of his hand moves the ball through the air.
3. The girl stops the ball when she catches it using the pushing force in the opposite direction.

1 يقف الولد بجانب الشجرة (موضع البداية). 2 تتحرك الكرة في الهواء بسبب قوة الدفع للولد.

3 تقوم البنت بالتقاط الكرة وإيقافها عن طريق قوة الدفع أيضًا ولكن في اتجاه معاكس.

» The position of the ball changes relative to the tree (fixed point).

« يتغير موضع الكرة بالنسبة للشجرة (الجسم الثابت).

» **Gravity:** It is the force that pulls objects downward, causing the ball to be dropped into your friend's hand.

« قوة الجاذبية جذبت الأجسام لأسفل وتسببت في سقوط الكرة بيد صديقك.

Motion • It is the change in an object's position relative to a fixed point.

هو تغير موضع الجسم مع مرور الزمن بالنسبة لنقطة ثابتة.

For any object to be in motion:

1. A pushing or pulling force must act on it.

1 لا بد أن يؤثر على الجسم قوة دفع أو سحب.

2. The object must change in position as time passes.

2 لا بد أن يحدث تغير لموضع الجسم مع مرور زمن معين.

Some Motions Are Easy to Be Se

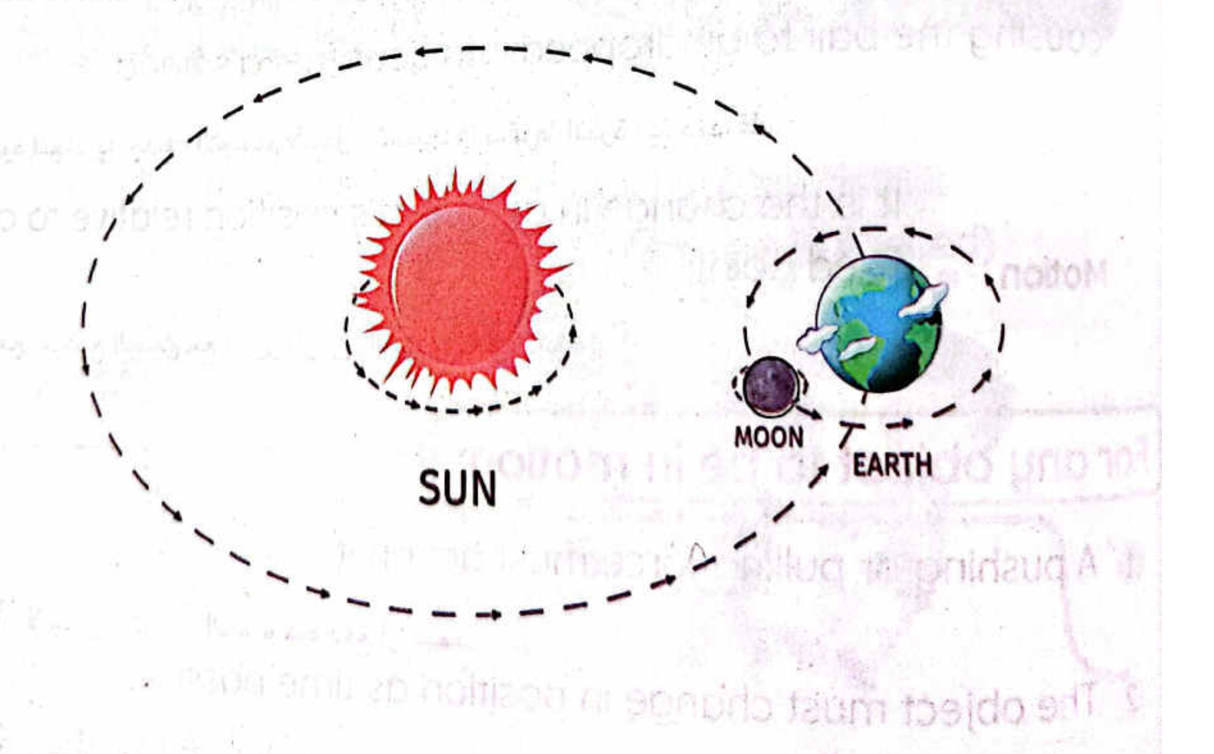
A person walking

A leaf falling

A ball is thrown

Some Motions Are Hard to Be Seen

Earth's rotation around the Sun. دوران الأرض حول الشمس.







1 Choose the correct answer:

1. Pushing and pulling forces can be used for ....
   a. moving objects
   b. stopping objects
   c. changing the speed of objects
   d. all the previous
2. Wind can move some objects, such as ....
   a. tree roots
   b. leaves
   c. jet airplanes
   d. rockets
3. By decreasing the number of fire extinguishers that are attached to the the cart, the speed of the cart ....
   a. becomes zero
   b. remains constant
   c. decreases
   d. increases
4. When the air is released backward from the fire extinguisher, the cart moves ....
   a. backward
   b. forward
   c. upward
   d. downward
5. In the tug-of-war game, the two teams ....
   a. push the ball in the same direction
   b. pull the rope in opposite directions
   c. push the rope in opposite directions
   d. pull the rope in the same direction
6. The rope in the tug-of-war game moves when the forces acting on it are ....
   a. equal
   b. balanced
   c. unbalanced
   d. equal to zero
7. .... forces cause the movement of static objects.
   a. Balanced
   b. Unbalanced
   c. Friction
   d. Equal
8. The motion of .... can't be seen by the naked eye.
   a. fireflies
   b. honeybees
   c. Earth
   d. trains
9. .... is the force that attracts objects toward Earth's surface.
   a. Magnetic energy
   b. Electrical energy
   c. Friction force
   d. Gravity

10. Throwing an object upward is affected by the .... force of your hand and the .... force of gravity.
    a. pulling - pushing
    b. pulling - pulling
    c. pushing - pulling
    d. pushing - pushing

2 Write the scientific term:

1. The change in the position of an object relative to a fixed point. (..............)
2. The force that attracts objects to the Earth's center. (..............)
3. The force used to move objects away from you. (..............)
4. The force used to move objects toward you. (..............)
5. A game in which two teams pull the rope in opposite directions. (..............)

3 Put (✓) or (✗):

1. A static object can't move when no force acts on it. (   )
2. Gravity is considered a pulling force. (   )
3. An object needs force to move, but it doesn't need any force to stop. (   )
4. As the air is released backward from the fire extinguisher, the cart begins to move backward. (   )
5. The cart covers a longer distance by decreasing the number of fire extinguishers attached to it. (   )
6. The goalkeeper catches the ball using the pushing force of his hands. (   )
7. A static car moves when the forces acting on it are unbalanced. (   )
8. In the tug-of-war game, the two teams push the ball in opposite directions. (   )
9. The rope moves toward the greater force when the forces acting on it are balanced. (   )
10. Some motions can't be seen by the eye, such as leaves falling from a tree. (   )

4 Complete the following sentences:

1. Motion is the change in an object's .... relative to ....
2. .... force makes an object move toward you, while .... force makes an object move away from you.
3. The goalkeeper catches the ball using the .... force of his hands.
4. The bus begins to move using the .... force of its engine.
5. Force is used to .... or stop objects, or to change an object's .... or ....
6. We can move a box from its .... using .... force or .... force.
7. .... is the force that pulls objects toward Earth's ....
8. When the boy throws the ball upward, it is affected by the .... force of the boy's hands and the .... force of gravity.
9. Some motions can easily be seen by the eye, such as .... or ...., while the motion of the Earth ....
10. Air can move some objects, such as ....
11. By increasing the number of fire extinguishers on the cart, it covers .... distance as its speed ....
12. When the air is released .... from the fire extinguishers, the cart moves forward.
13. In the tug-of-war game, two teams .... the rope in .... directions.
14. In the tug-of-war game, the rope moves toward .... force when the forces acting on it are ...., while the rope doesn't move when .... force acts on it.

5 Cross out the odd word:

1. Pushing force - Pulling force - Gravity
2. A person walking - Earth rotation - A leaf falling
3. Tug-of-war - Opposite direction - Pushing force - Pulling force
4. An object moving - Balanced force - Unbalanced force

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Motion	a. is the force that attracts the objects toward Earth's surface.
2 Gravity	b. means that the object is moved away from you.
3 Pulling force	c. is the change of an object's position relative to a fixed point.
4 Pushing force	d. means that the object is moved toward you.

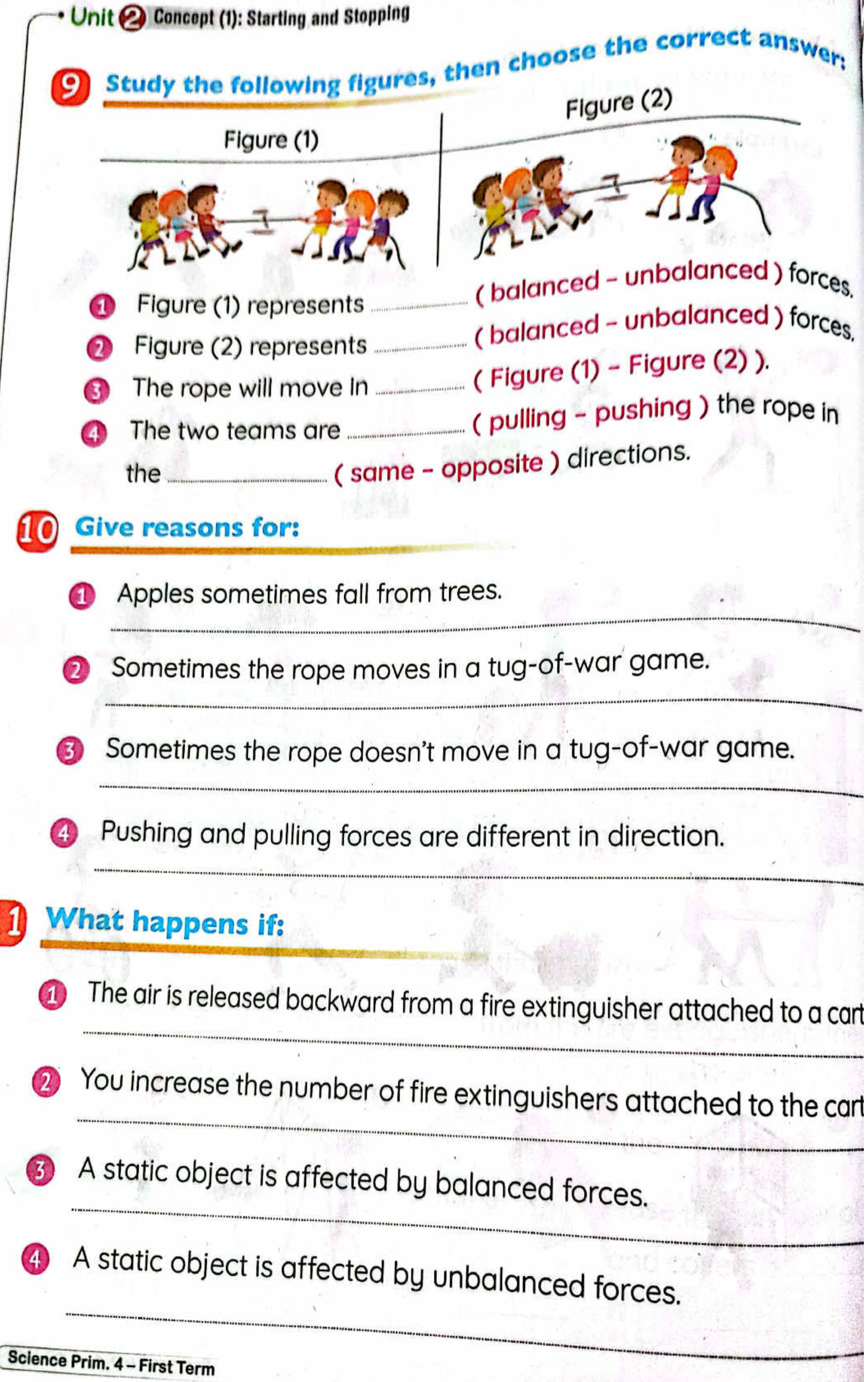
1 .... 2 .... 3 .... 4 ....

7 Study the following figure, then complete the sentences:

1. .... will reach the finish line first.
2. Adam will cover .... distance than Kenzy.
3. When the air is released .... from the fire extinguishers, the car moves ....
4. Both cars move due to the .... force of the ....
5. From the figure, we conclude that as we increase the number of fire extinguishers, the car becomes .... and covers .... distance.

8 Study the following figures, then classify them into pushing or pulling force:





9 Study the following figures, then choose the correct answer:

Figure (1)	Figure (2)

1. Figure (1) represents .... (balanced – unbalanced) forces.
2. Figure (2) represents .... (balanced – unbalanced) forces.
3. The rope will move in .... (Figure (1) – Figure (2)).
4. The two teams are .... (pulling – pushing) the rope in the .... (same – opposite) directions.

10 Give reasons for:

1. Apples sometimes fall from trees.
   ....
2. Sometimes the rope moves in a tug-of-war game.
   ....
3. Sometimes the rope doesn't move in a tug-of-war game.
   ....
4. Pushing and pulling forces are different in direction.
   ....

11 What happens if:

1. The air is released backward from a fire extinguisher attached to a cart.
   ....
2. You increase the number of fire extinguishers attached to the cart.
   ....
3. A static object is affected by balanced forces.
   ....
4. A static object is affected by unbalanced forces.
   ....



Lesson 3

Activity 6 Force

Force
القوة

It is a push or pull that is applied to object to change its position.

هو دفع أو سحب جسم مما يؤدي لتغيير موقعه.

Examples



Sitting on a chair:

Gravity is pulling the girl downward.

عند الجلوس على الكرسي:

قوة الجاذبية تجذب البنت لأسفل وتعمل على ثباتها على الكرسي.





Holding objects:

The man's arm is pulling the bag upward, while gravity is pulling the bag downward.

عندما ترفع حقيبتك:

قوة الجاذبية تجذب الحقيبة لأسفل بينما ترفعها ذراعك للأعلى.



- The world around us is in constant motion, and there are two forces affecting motion: the pushing force, and the pulling force.

- The direction of motion is determined by the total force applied to the object.

يتحدد اتجاه الحركة بمقدار القوى المحصلة المؤثرة على الجسم.

Activity 8 Stopping Motion

Stopping Motion توقف الأجسام

A moving object stops when:

» An equal amount of force is applied to it in the opposite direction.

« يتوقف الجسم عن الحركة عندما تكون القوى المؤثرة على الجسم متساوية في المقدار ومتضادة في الاتجاه.

Example:

» When a moving car crashes into a wall, it stops.

« تتوقف السيارة عن الحركة عند اصطدامها بالجدار.

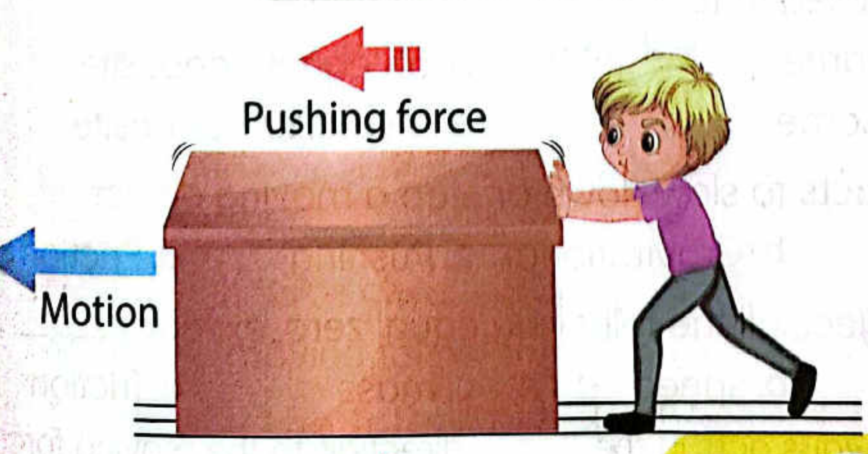
» Because the wall applied a force to the car with the same amount and in the opposite direction.

« يؤثر الحائط على السيارة بقوة مساوية لقوة السيارة وفي اتجاه معاكس.



Friction Force قوة الاحتكاك

- It is a force that arises between two touching surfaces.
  هي القوة التي تظهر بين سطحين متلامسين.
- It acts in the opposite direction of the object.
  تؤثر في عكس اتجاه قوة الجسم.
- It always slows down or stops moving objects.
  تعمل على إبطاء الجسم أو إيقافه.





Activity 9 Optional Activity
Launching a Satellite



Activity 8 Stopping Motion

Stopping Motion توقف الأجسام

A moving object stops when:

- An equal amount of force is applied to it in the opposite direction.
- يتوقف الجسم عن الحركة عندما تكون القوى المؤثرة على الجسم متساوية في المقدار ومتضادة في الاتجاه.

Example:

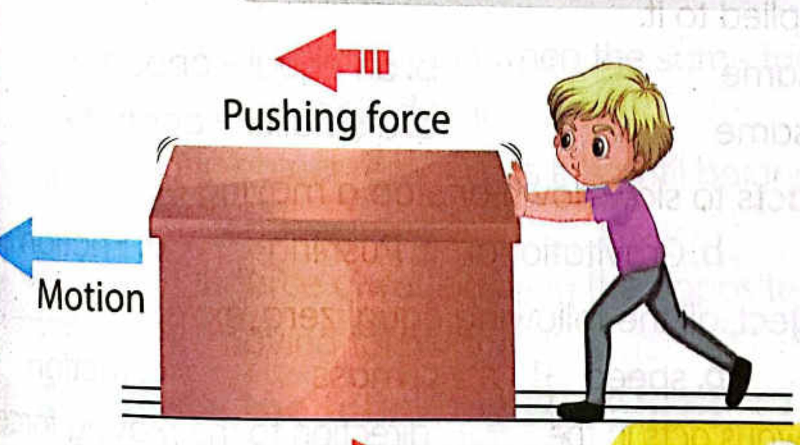


- When a moving car crashes into a wall, it stops.
- تتوقف السيارة عن الحركة عند اصطدامها بالجدار.
- Because the wall applied a force to the car with the same amount and in the opposite direction.
- يؤثر الحائط على السيارة بقوة مساوية لقوة السيارة وفي اتجاه معاكس.



Friction Force قوة الاحتكاك

- It is a force that arises between two touching surfaces.
  هي القوة التي تظهر بين سطحين متلامسين.
- It acts in the opposite direction of the object.
  تؤثر فى عكس اتجاه قوة الجسم.
- It always slows down or stops moving objects.
  تعمل على إبطاء الجسم أو إيقافه.













1 Choose the correct answer:

1. The bag in the opposite figure is affected by ....
   a. pulling force upward only
   b. pushing force upward only
   c. pulling force downward only
   d. pulling force upward and downward
2. The book in the opposite figure is affected by ....
   a. pushing force downward
   b. pulling force downward
   c. pushing force forward
   d. pulling force upward
3. By increasing the force acting on an object, it covers .... distance.
   a. no b. same c. longer d. shorter
4. The rope in a tug-of-war game moves toward the .... force.
   a. greater b. smaller c. closer d. farther
5. When two equal forces act on a moving object but in the opposite directions, the object's speed ....
   a. increases
   b. decreases
   c. remains constant
   d. becomes zero
6. A moving object stops when .... force in the .... direction is applied to it.
   a. an equal - same
   b. an equal - opposite
   c. a greater - same
   d. a smaller - opposite
7. .... force acts to slow down or stop a moving object.
   a. Magnetic b. Gravitational c. Pushing d. Friction
8. For a static object, all the following equal zero, except ....
   a. force b. speed c. mass d. friction
9. Friction force always acts in the .... direction to the moving force.
   a. same
   b. opposite
   c. parallel
   d. perpendicular

10. The car will move up the slope when ....
   a. moving force < friction force
   b. moving force = friction force
   c. moving force > friction force

2 Write the scientific term:

1. A push or pull that is applied to an object to move it. (..................)
2. The forces that act on an object and cause its movement. (..................)
3. The forces that act on an object but don't cause any movement. (..................)
4. The force that slows down a moving object until it stops. (..................)

3 Put (✓) or (✗):

1. The book on the table is static because it is affected by balanced forces. (   )
2. The ball on the ground is affected by the pulling force of gravity only. (   )
3. The direction of force is determined by the total force applied to an object. (   )
4. The speed of an object increases by decreasing the forces acting on it. (   )
5. The rope in a tug-of-war game always moves toward the greater force. (   )
6. A moving object stops when the same force in the same direction is applied to it. (   )
7. A static object remains as it is until balanced forces act on it. (   )
8. Friction force always acts in the opposite direction of the moving force. (   )

4 Complete the following sentences:

1. .... always pulls objects downward, while .... force must exist between two surfaces when the object is in a state of ....

2. A man's arm is pulling the bag ...., while gravity is pulling the bag ....
3. The rope in a tug-of-war game moves toward the .... force if the forces acting on the rope are ....
4. The moving object stops when .... force in .... direction is applied to it.
5. .... force arises between two surfaces and it acts in the .... direction to the moving force, so it .... the object until it ....

5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Balanced force	a. causes objects to fall downward.
2 Unbalanced force	b. don't cause any change to the object's state.
3 Friction force	c. cause static objects to move.
4 Gravity	d. causes moving objects to slow down and stop.

1 .... 2 .... 3 .... 4 ....

6 Study the following figure, then answer the questions:

1. The opposite figure represents an apple falling from a tree and a boy catching it, complete the following:

a. The apple falling down is considered .... force.

b. Catching the apple is considered .... force.

2. Label the following figure:

Force .... Force ....

7 Study the following figures, then classify them into balanced or unbalanced forces:

1	2	3 ....
4	5	6 ....

Pull Push

8 Give reasons for:

1. Friction force causes a moving object to stop.

   ....

2. When the girl stops pedaling, the bike stops after a short time.

   ....

3. When a moving car crashes into a wall, it stops moving.

   ....

9 What happens if:

1. A girl an a bike stops pedaling.

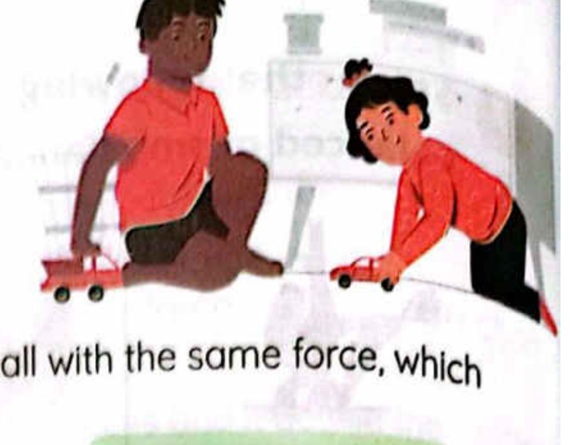
   ....

2. A moving car crashes into a wall.

   ....

Lesson 4



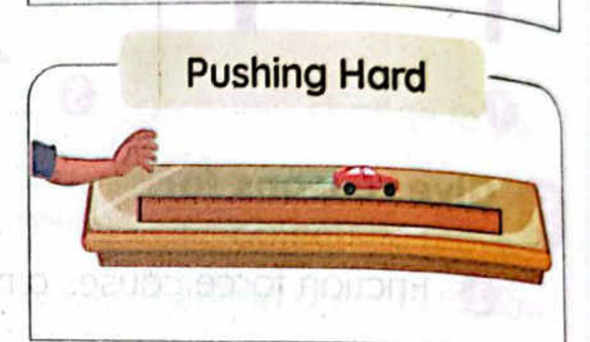


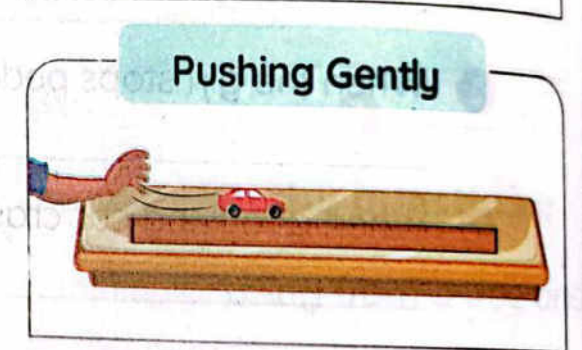
Activity 10 Rolling Cars

» If we push a tennis ball and a bowling ball with the same force, which one will move a longer distance?

Activity

The effect of force on a static object.





Tools:

1. Toy car.
2. Measuring ruler.

Steps:

1. Push the toy car hard from the starting point.
2. Record the distance covered by the car using the measuring ruler.
3. Repeat steps (1) and (2) several times and record this data in a table, then calculate the average distance.
4. Push the toy car gently from the starting point.
5. Record the distance covered by the car using the measuring ruler.
6. Repeat steps (4) and (5) several times and record this data in a table, then calculate the average distance.

Results:

Table (A): When the toy car is pushed hard:

Trial	1	2	3	4
Distance	11	14	15	16

Average distance = $\frac{11 + 14 + 15 + 16}{4} = \frac{56}{4} = 14$ cm.

Table (B): When the toy car is pushed gently:

Trial	1	2	3	4
Distance	8	10	12	14

Average distance = $\frac{8 + 10 + 12 + 14}{4} = \frac{44}{4} = 11$ cm.

Conclusion:

- As we increase the force that acts on the body, it moves for a longer distance. Its speed increases and its kinetic energy increases.

كلما زادت القوة المؤثرة على الجسم يتحرك الجسم مسافة أكبر، وتزداد سرعة الجسم وطاقة حركته.

When we push a car hard:

The car moves **faster** and covers a **longer** distance.

عند دفع السيارة بقوة.

تتحرك السيارة بسرعة وتقطع مسافة أطول.

When we push a car gently:

The car moves **slower** and covers a **shorter** distance.

عند دفع السيارة برفق.

تتحرك السيارة ببطء وتقطع مسافة أقصر.

By increasing the acting force on a body:

- Its speed and kinetic energy increase, and the distance covered increases.

- بزيادة القوة المؤثرة على الجسم فإن سرعته وطاقة الحركة لديه تزداد – تزداد المسافة المقطوعة.

By applying the same force to different objects:

- **A small car** moves for a **long** distance.
- **A big truck** moves for a **short** distance.

- عندما تؤثر نفس القوة على أجسام مختلفة.

السيارة تسير لمسافة **كبيرة** – الشاحنة تسير لمسافة **صغيرة**.





1 Choose the correct answer:

1. When the player kicks the ball hard, the ball ....
   a. moves slower and covers a shorter distance
   b. moves slower and covers a longer distance
   c. moves faster and covers a shorter distance
   d. moves faster and covers a longer distance
2. Which car covers the longest distance?
   a. A small car pushed gently.
   b. A big truck pushed hard.
   c. A small car pushed hard.
   d. A big truck pushed gently.
3. By decreasing the force acting on a body, its kinetic energy ....
   a. increases　b. decreases
   c. remains constant　d. becomes zero
4. The distance covered by the object depends on all the following, except the ....
   a. force acting on it　b. mass of the object
   c. color of the object　d. friction force effect on it
5. By increasing the pushing force on an object, all of the following increase, except the object's ....
   a. speed　b. distance　c. kinetic energy　d. mass
6. Gravity always pulls objects ....
   a. upward　b. downward　c. forward　d. backward
7. If the object moves forward, friction force affects it in the .... direction.
   a. upward　b. downward　c. forward　d. backward
8. A big truck covers a distance .... a small car if the same force is applied to them.
   a. smaller than　b. equal to　c. longer than　d. similar to

2 Put (✓) or (✗):

1. An object travels for a short distance when it is pushed gently. (   )
2. Kinetic energy decreases by increasing the object's speed. (   )
3. As the object becomes faster, it covers a longer distance. (   )
4. A big truck covers a longer distance than a small car if they were pushed with the same force. (   )
5. When you throw a ball into the air, it's affected by the force of gravity only. (   )

3 Complete the following sentences:

1. When the player hits the tennis ball gently, it covers a ______ distance.
2. By increasing the acting force that affects the object, it covers a .... distance and its speed ....
3. As the kinetic energy of an object increases, it travels for ______ distance.
4. A small car covers .... distance than a big truck if the same force is applied on them.
5. Throwing a ball in the air is affected by the .... force of your hands and the .... force of gravity.

4 Give reasons for:

1. When you push the toy car gently, it moves for a short distance and vice versa. ....
2. A big truck covers a longer distance than a small car when the same force is applied to them.

....

5 What happens if:

1. You push a toy car gently. (Concerning its distance)

....

2. You push a toy car hard. (Concerning its kinetic energy)

....

3. The same pushing force is applied to a big toy truck and a small toy car.

....

4. You increase the applied force on the same object.

....

Lesson 5

Activity 11 Energy, Work and Force



1. The girl gets the needed energy from eating food.
   « تحصل الفتاة على الطاقة اللازمة من تناول الطعام.

2. This energy enables the girl to ride the bike.
   « هذه الطاقة تمكن الفتاة من تحريك الدراجة.

3. When the bike moves, we say the girl is doing work.
   « عندما تتحرك الدراجة نستطيع أن نقول: إن الفتاة بذلت شغلًا.



» The boy who pushes the wall doesn't do any work because the wall doesn't move.

« الولد لا يقوم بشغل لأنه لم يستطع تحريك الحائط.

Force: It is the effect that changes energy into work done.



» When a man pushes the car, energy transfers from the man to the car.

Energy الطاقة	gives us →	force القوة	enables us to do →	work الشغل

It is the ability to do work.
هو القدرة على بذل شغل.





1 Choose the correct answer:

1. The goalkeeper can catch the ball by applying .... force on the ball.
   a. pulling b. pushing
   c. friction d. lifting
2. The girl gets the .... needed to study hard from eating food.
   a. force b. work c. energy d. speed
3. The boy that pushes a wall doesn't do any work because ....
   a. there is no force acting on the wall
   b. the boy didn't eat breakfast
   c. the boy is still young
   d. the wall doesn't move
4. Moving a static object requires that a proper .... acts on it.
   a. force b. work c. energy d. speed
5. When the man pushes the car, kinetic energy ....
   a. changes to potential energy
   b. becomes zero
   c. transfers from the man to the car
   d. transfers from the car to the man



2 Write the scientific term:

1. It affects an object and changes its state. (........)
2. The ability to do work. (........)
3. It is the energy needed to move an object by applying force to it. (........)

3 Put (✓) or (✗):

1. When the player hits the ball with the hockey bat, we say that he does work. ( )
2. Kicking the ball hard needs a strong pulling force. ( )
3. If the boy applies a great force to move a box, but the box doesn't move, we can say that the boy uses energy but he doesn't do any work. ( )
4. If the boy stops the toy car with his hands, we can say that he doesn't do any work. ( )
5. When you push a table, energy transfers from the table to your body. ( )
6. Force is the effect that changes work and turns it into energy. ( )

4 Complete the following sentences:

1. To move or stop any object, we can apply either .... or .... forces.
2. We get the .... needed to do .... from the food we eat.
3. When a static object ...., we can say we don't do work.
4. When a moving object ...., we can say we do work.
5. .... is an effect that changes energy into .... done.

5 Give reasons for:

1. Food is necessary for the living organisms.

....

....

2. The man who pushes the car does work.

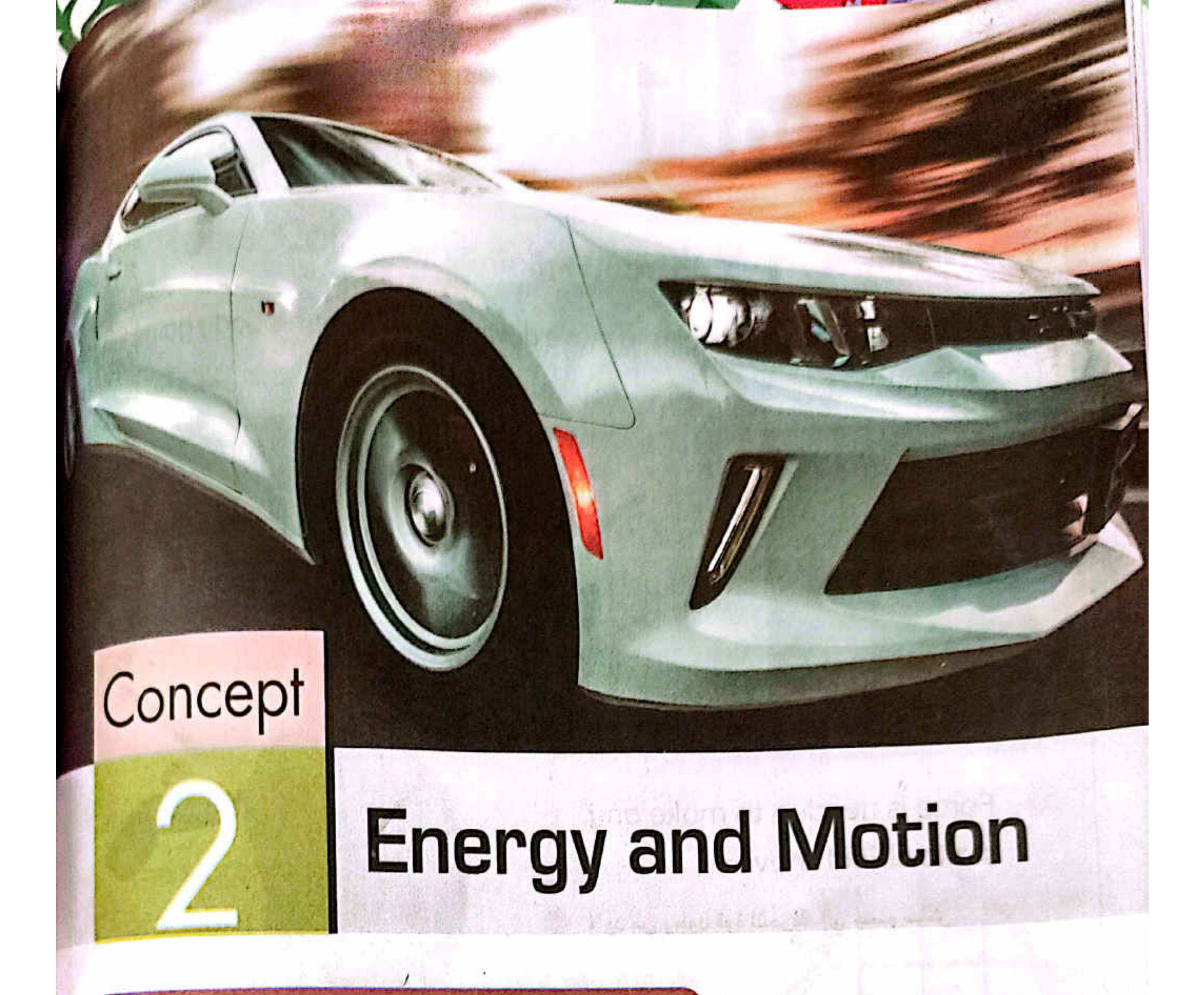
....

....

3. The man who pushes the wall doesn't do any work.

....

....



Concept 2 Energy and Motion

In this concept, we are going to study:

- Roller coasters.
- Basics of energy.
- Properties of energy.
- Types of energy.
- Kinetic energy and potential energy.

Key Vocabulary

- Kinetic energy
- Potential energy
- Thermal energy
- Chemical energy

Lesson 1



Activity 1 Can You Explain?

» When a sand surfer begins to move down a sand dune, his body gains kinetic energy.

« عندما يبدأ شخص التزلج بسرعة عالية على الكثبان الرملية فإن جسمه يكتسب طاقة حركية.







» Force is needed to make any static object move.

« لا بد من وجود قوة لتحريك أي جسم ساكن.

When no force acts on the ball, the ball on the slope remains static and stores potential energy.

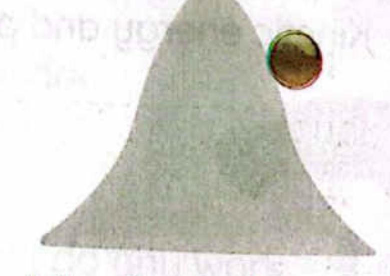
عندما لا تؤثر على الكرة قوة مناسبة،
تظل الكرة على المنحدر ثابتة
وتخزن طاقة وضع بداخلها.



Static objects store **potential** energy.

When a force acts on the ball, the ball moves and gains kinetic energy.

عندما تؤثر على الكرة قوة مناسبة،
تتحرك الكرة على المنحدر
وتكتسب طاقة حركية.



Moving objects have **kinetic** energy.

Activity 2 Roller Coaster

Roller Coaster Game قطار الملاهي السريع





At the beginning,

electricity and motors carry the train cars up to the top of the ramp.

تعمل الكهرباء والمحركات على حمل عربات القطار لأعلى المنحدر.



1 While moving upward - أثناء الصعود لأعلى

» The stored potential energy increases gradually.

« تزداد طاقة الوضع المخزنة داخل القطار تدريجيًا.





2 At the highest point (on the ramp) - عند أعلى المنحدر

» The stored potential energy becomes maximum.

« تصبح الطاقة المخزنة (طاقة الوضع) أكبر ما يمكن.

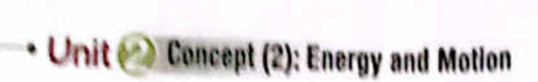




3 While sliding down - أثناء الانزلاق

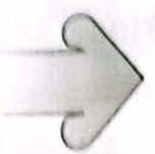
» The stored potential energy is converted gradually into kinetic energy.
As we move down, the speed increases and kinetic energy increases.

« تتحول الطاقة المختزنة لطاقة حركية تدريجيًا.
كلما اقتربنا من الأرض، تزيد سرعة الجسم وطاقة حركته.



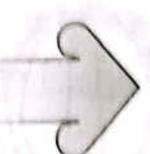


As height increases
(While moving up)

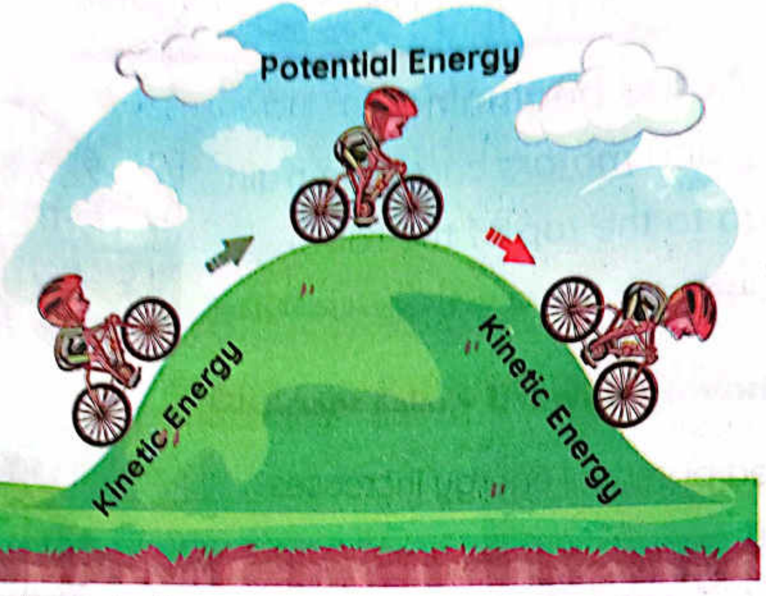


Potential energy increases

As speed increases
(While moving down)



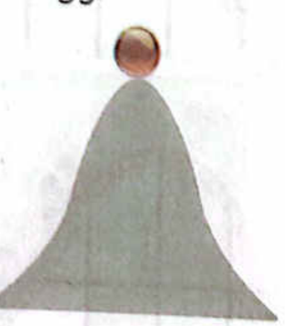
Kinetic energy increases



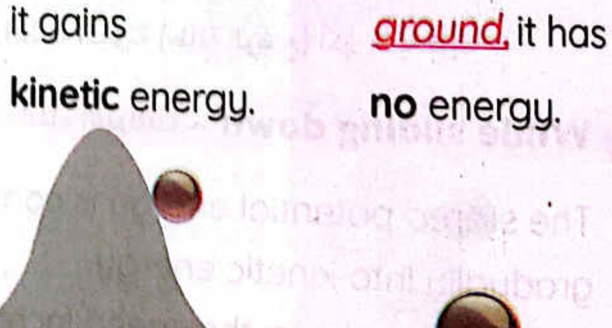
» The object loses its kinetic energy when it stops.

» يفقد الجسم طاقة حركته عندما يتوقف الجسم عن الحركة.

» The static object on a hill Stores **potential** energy.



» When the object moves, it gains **kinetic** energy.



» When the static object is on the ground, it has **no** energy.





Activity 3 Optional Activity
Energy Around Us





1 Choose the correct answer:

1. When a sand surfer slides down a sand dune, the stored energy in his body ....
   a. increases　　b. decreases
   c. becomes zero　　d. remains constant

2. The potential energy of a ball increases when the ball ....
   a. moves down in the air　　b. stops on the ground
   c. moves on the ground　　d. moves up in the air

3. The static ball on the .... has no energy.
   a. ramp　　b. table　　c. ground　　d. chair

4. .... help(s) the cars of a roller coaster to move up the ramp.
   a. Electricity only　　b. Motors only
   c. Electricity and motors　　d. Electricity and dynamo

5. At the highest point on the ramp, the stored energy of an object ....
   a. increases　　b. decreases
   c. becomes zero　　d. becomes maximum

6. The roller coaster cars move faster during ....
   a. moving up　　b. sliding down
   c. stopping suddenly　　d. changing the direction

7. As a roller coaster moves up or down, which of the following remains constant?
   a. Its speed　　b. Kinetic energy
   c. Potential energy　　d. Its mass

8. In the opposite figure, the object's .... equals zero.
   a. mass　　b. height
   c. speed　　d. energy

9. All of these objects have energy, except ....
   a. a truck moving on a flat road　　b. a static toy car on a table
   c. a basketball moving in the air　　d. a static ball on the ground

10. As an object's ______ increases, its kinetic energy increases.
a. height b. speed
c. potential energy d. size

2 Write the scientific term:

1. The energy stored in the object at the top of the ramp. (............)
2. The energy gained by an object due to its motion. (............)
3. The energy that helps the cars of a roller coaster to move up. (............)

3 Put (✓) or (✗):

1. The apple on the tree has no energy, but it gains energy while falling down. ( )
2. The speed of a roller coaster increases as it moves down the ramp. ( )
3. A static object at the top of the ramp has no kinetic energy. ( )
4. While moving upward, the speed of the roller coaster decreases gradually. ( )

4 Complete the following sentences:

1. When a sand surfer begins to slide down, his stored ______ energy changes gradually into ______ energy.
2. A static object on ______ has no energy, while a static object on ______ stores energy.
3. Roller coaster cars don't need electricity during ______ .
4. When a static ball rolls down a ramp, it gains ______ energy.
5. ______ and ______ help the train cars of roller coasters to move up.
6. While moving ______, the stored ______ energy increases, but during sliding down, the speed of the object ______ .

5 Cross out the odd word:

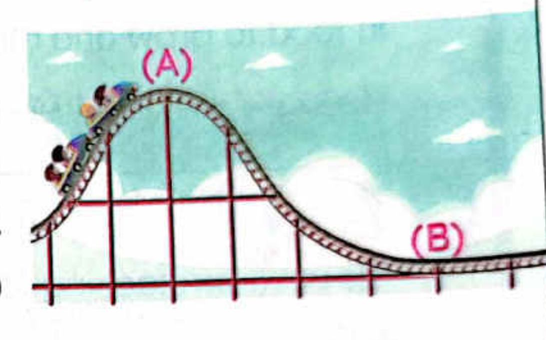
1. Potential energy – Object's height – Object's speed (............)
2. Kinetic energy – Object's height – Object's speed (............)

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 While moving up	a. a static ball has no energy.
2 While sliding down	b. an object has the most potential energy.
3 At the top of the ramp	c. a static object has the most kinetic energy.
4 At the ground	d. potential energy changes to kinetic energy gradually.
	e. kinetic energy changes to potential energy gradually.

1 .... 2 .... 3 .... 4 ....

7 Study the following figure, then complete:



1 .... energy increases when the roller coaster moves from (A) to (B).

2 .... energy increases when the roller coaster moves from (B) to (A).

3 The roller coaster at point (........) has the highest potential energy.

4 .... and .... help the roller coaster to move from (B) to (A).

8 Give reasons for:

1 While moving upward, the stored potential energy increases.
....

2 While moving down the ramp, the kinetic energy increases.
....

3 Electricity is very important to operate a roller coaster.
....

9 What happens if:

1 Roller coaster cars move up the ramp.
....

2 Roller coaster cars slide down the ramp.
....

3 Roller coasters reach the top of the ramp.
....

4 Roller coasters stop in the end at the ground.
....

Activity 4 What Do You Already Know About Energy and Motion?

Importance of energy in our life:

1 The body needs chemical energy stored in food to grow and move. « يحتاج الجسم إلى الطاقة الكيميائية المخزنة في الغذاء لينمو ويتحرك.	
2 It is used for cooking food or heating water. « تستخدم في طهي الطعام وتسخين المياه.	
3 It is used for lighting houses and streets. « إنارة المنازل والشوارع.	
4 Energy affects the motion and position of objects. « تؤثر الطاقة على حركة الأجسام وتغير مكانها.	

Put (✓) or (✗):

A bar of chocolate has no energy. ( )



Moving Energy انتقال الطاقة

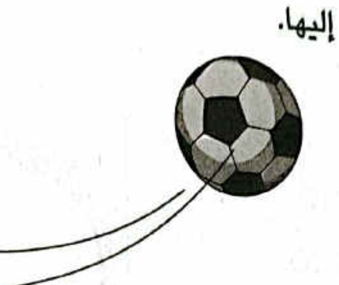
Example: When a football player kicks the ball.

1. Kinetic energy (motion) transfers from the player's foot to the ball, so the ball moves.
تنتقل طاقة الحركة من قدم اللاعب إلى الكرة فتتحرك الكرة.

2. The ball moves in the air because it gains kinetic energy.
تحرك الكرة في الهواء نتيجة انتقال طاقة الحركة إليها.

3. Kinetic energy transfers from the ball to the goal net which vibrates because kinetic energy transfers from the ball to it.
تنتقل الطاقة من الكرة للشباك التي تهتز.







Activity 5 Energy Basics

Energy Basics مبادئ الطاقة

Energy → gives us → force → enables us to do → work

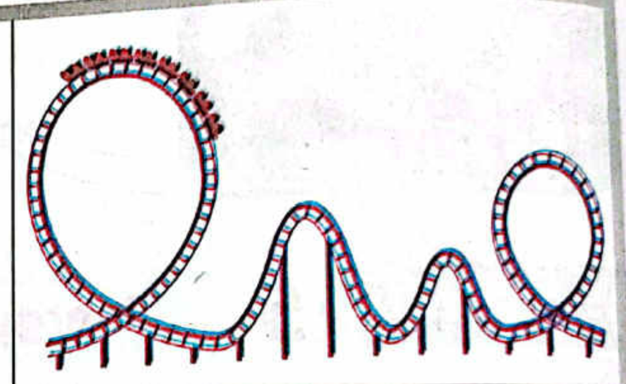
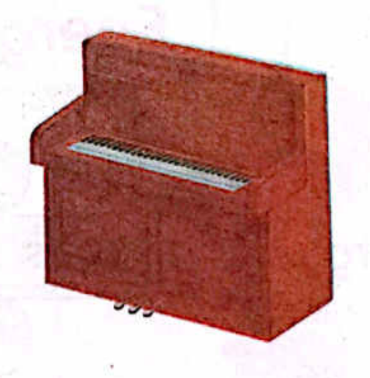
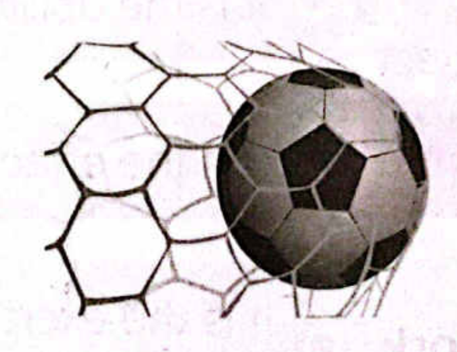
- **Energy**: It is the ability to do work.
- **Force**: It is the effect that changes energy into work done.
- **Work**: It is the exerted force applied to an object and it causes motion. هي القوة التي تؤثر على الجسم وتحركه.

Relationship Between Energy and Work



- Our body gets the energy it needs from food.
  يحصل جسم الإنسان على الطاقة اللازمة من الغذاء.
- This energy enables us to exert force.
  تساعدنا الطاقة في التاثير بقوة على الأجسام.
- This force moves the object.
  تقوم القوة بتحريك الجسم من مكانه.
- When the object moves, we say our body did work.
  عندما يتحرك الجسم يقال إن الجسم بذل شغلًا.

Properties of energy:

1 Energy can be stored and changed from one form to another, as with a roller coaster. يمكن تخزين الطاقة وتحويلها من صورة لصورة أخرى كما في عربة الملاهي.	
2 Most forms of energy can't be seen, such as sound, thermal, chemical and electrical energies. معظم صور الطاقة لا يمكن رؤيتها مثل الطاقة الصوتية والحرارية والكيميائية والكهربية.	
3 We can see and measure what energy can do. يمكننا رؤية وقياس ما يمكن أن تفعله الطاقة. **Example:** The goal net vibrates when kinetic energy transfers to it.	



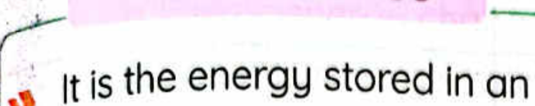



Activity 6 Kinetic and Potential Energy



Scientists classify energy into two types





Potential Energy

- It is the energy stored in an object due to its **position**.

هي الطاقة المختزنة داخل الجسم بسبب موضعه.

Example:

When you raise the ball.

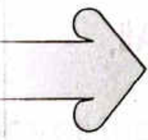
Kinetic Energy

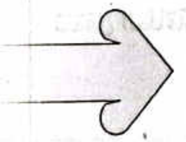
- It is the energy an object has due to its **motion**.

الطاقة التي يمتلكها الجسم بسبب حركته.

Example:

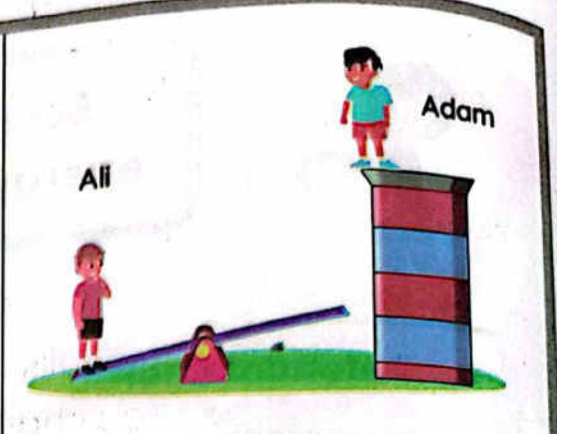
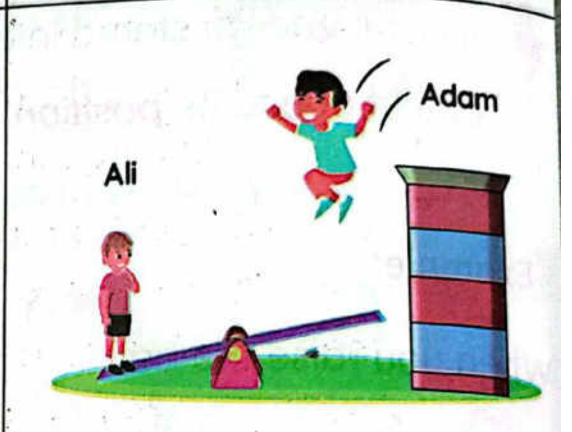
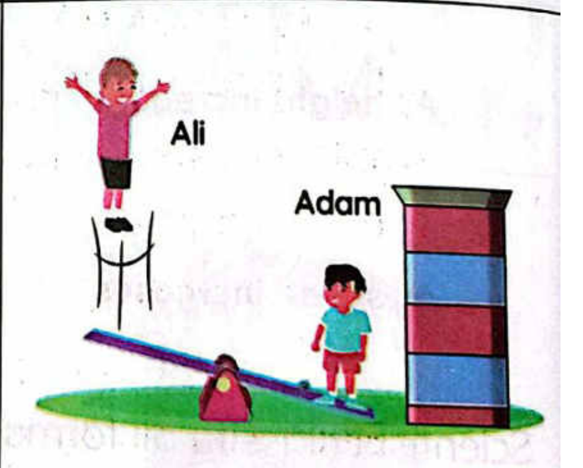
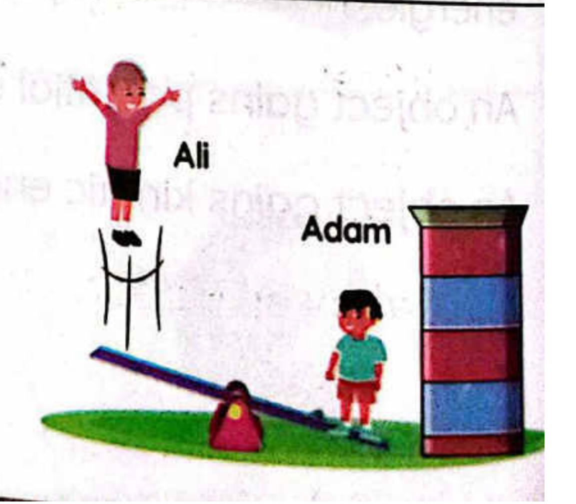
When you leave the ball to fall.

As height increases  **Potential energy increases**

As speed increases  **Kinetic energy increases**

- Scientists classify all forms of energy into kinetic and potential energies.
- An object gains potential energy when it rises up.
- An object gains kinetic energy when it moves.

Example: Potential Energy Changes to Kinetic Energy:

Adam on the tower has large potential energy. آدم فوق البرج لديه طاقة وضع كبيرة.	
When Adam jumps down, the potential energy is changed into kinetic energy. عندما يقفز آدم لأسفل تتحول طاقة الوضع إلى طاقة حركة.	
Kinetic energy is transferred to Ali, which pushed him up in the air. تنتقل الطاقة الحركية من آدم إلى علي	
During Ali's movement in the air, kinetic energy is changed gradually into potential energy. أثناء ارتفاع علي لأعلى تتحول طاقة الحركة إلى طاقة وضع تدريجيًا.	



1 Choose the correct answer:

1. Humans need the .... energy stored in food to do all daily activities.
   a. kinetic b. chemical c. thermal d. potential
2. When the apple falls down from the tree, ...
   a. kinetic energy changes into potential energy
   b. potential energy changes into kinetic energy
   c. kinetic energy decreases
   d. potential energy increases
3. The goal net vibrates because kinetic energy transfers from ....
   a. the player's foot to the ball b. the ball to the player's foot
   c. the player's foot to the goal net d. the ball to the goal net
4. Force is the effect that changes ....
   a. energy into work b. work into energy
   c. the object's mass d. the object's temperature
5. A roller coaster contains all the following energies, except ....
   a. electrical energy b. potential energy
   c. thermal energy d. kinetic energy
6. .... is the energy that can be seen by the eye.
   a. Electrical energy b. Sound energy
   c. Thermal energy d. Light energy
7. Kinetic energy is the energy gained by an object due to its ....
   a. position b. shape c. his motion d. size
8. When an acrobat player jumps down, his .... increases.
   a. speed b. height
   c. mass d. potential energy

2 Write the scientific term:

1. The ability to do work or to make change. (..........)
2. The energy stored in an object due to its position. (..........)
3. The energy that an object gains due to its motion. (..........)
4. The effect that changes energy into work done. (..........)
5. The energy stored in an orange. (..........)

3 Put (✓) or (✗):

1. We eat food to gain potential energy. (   )
2. Thermal energy is used in cooking food and boiling water. (   )
3. When the player hits the ball, kinetic energy transfers from the ball to the tennis bat. (   )
4. A static object moves when it gains potential energy. (   )
5. When the book falls from the table, kinetic energy changes gradually into potential energy. (   )
6. In a roller coaster, kinetic energy is converted into potential energy and vice versa. (   )
7. As an object moves faster, its potential energy increases. (   )
8. Some forms of energy can be seen by the eye. (   )
9. Force gives us energy that enables us to do work. (   )
10. We can measure what energy can do when an object changes its position. (   )

4 Complete the following sentences:

1. Energy affects static objects and makes them .... or change their ....
2. When the player kicks the ball, kinetic energy transfers from the .... to the ....
3. When a static ball moves, we can say we did .... and the ball gains ....

4. Potential energy is the energy .... inside an object due to its ....
5. A static object moves when ...... force acts on it, so it gains ....
6. As the car moves faster, its kinetic energy ....
7. As the driver applies the brakes to decrease the car's speed, its kinetic energy ....
8. Force is the effect that changes .... into .... done.
9. .... and .... are forms of energy that can't be seen, while .... is the energy that can be seen by naked eye.
10. When the book falls from the table, its .... energy is converted into .... energy.
11. When the basketball is thrown up in the air, its .... increases.
12. Kinetic energy .... when an object stops moving.
13. A static book on the ground has .... energy, but when you put it on a table it has .... energy.

5 Complete the following diagram:

.... → gives us → force → enables us to do → ....

6 Study the following figures, then complete:

Figure (1)	Figure (2)	Figure (3)

a. In figure (2), ... energy is converted gradually into .... energy.

b. In figure (1), the ball has .... energy only.

c. In figure (3), the ball has .... energy.

7 Give reasons for:

1. A static book on a table has energy.
....
....
2. When the apple falls from the tree, its kinetic energy increases.
....
....
3. The ball moves when you kick it.
....
....
4. Energy is very important for us.
....
....
5. We can measure the effect of energy on objects.
....
....

8 What happens if:

1. A basketball is thrown up. (Concerning potential and kinetic energies)
....
....
2. A book falls from a table. (Concerning potential and kinetic energies)
....
....
3. You kick a ball. (Concerning kinetic energy)
....
....
4. A book is placed on a higher shelf. (Concerning potential energy)
....
....

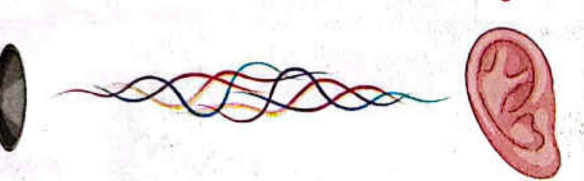
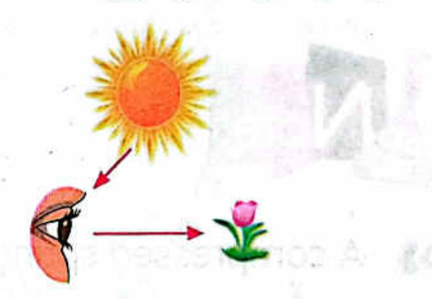
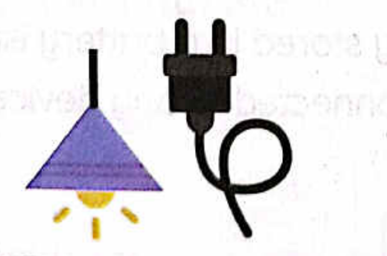
Lesson 3

Activity 7 Forms of Kinetic and Potential Energy

» All forms of energy can be classified into potential or kinetic energies.

« كل صور الطاقة يمكن تصنيفها إلى طاقة وضع أو طاقة حركة.

1 Forms of kinetic energy

1 Sound energy	2 Light energy
» Sound waves move through the air and reach the ears causing hearing. « تنتقل موجات الصوت خلال الهواء وتصل الأذن فتسبب السمع. 	» Light waves move through the air and reach the eyes causing sight. « تنتقل موجات الضوء خلال الهواء وتصل العين فتسبب الرؤية. 
3 Electrical energy	**4 Heat energy**
» Electricity moves through wires. « الكهرباء تسري داخل الأسلاك. 	» Vibration of water particles during boiling. « اهتزاز جزيئات المياه عند غليانها. 

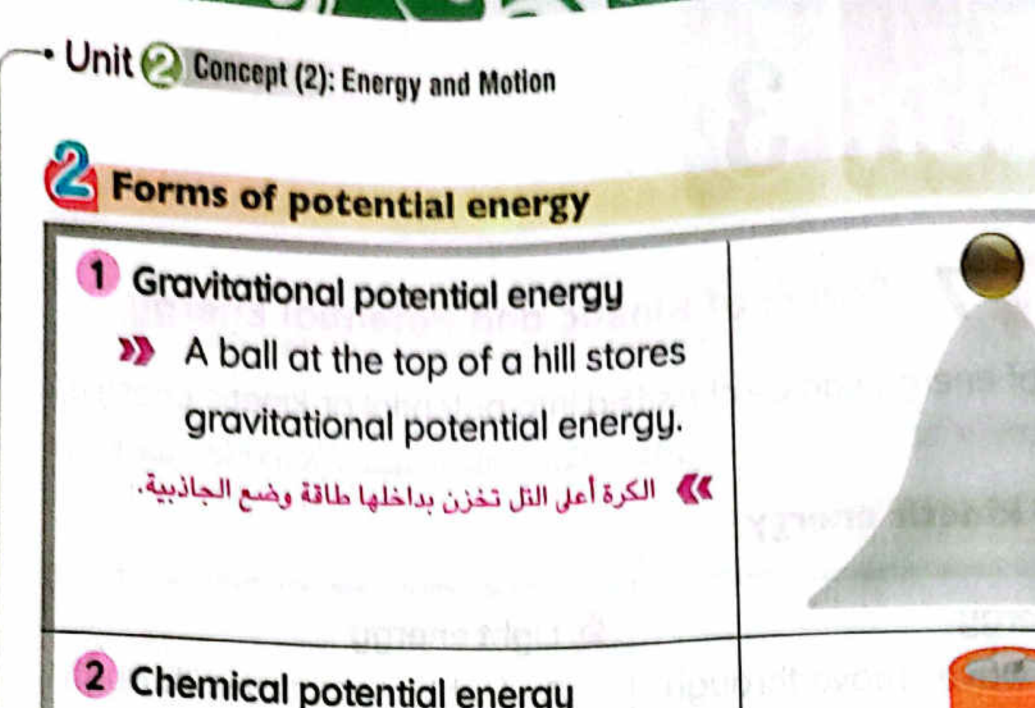
Kinetic energy depends on:

1. The <u>speed</u> of the body.
2. The <u>mass</u> of the body.

« تعتمد طاقة الحركة على سرعة الجسم وكتلته.



2 Forms of potential energy



1 Gravitational potential energy

» A ball at the top of a hill stores gravitational potential energy.

« الكرة أعلى التل تخزن بداخلها طاقة وضع الجاذبية.

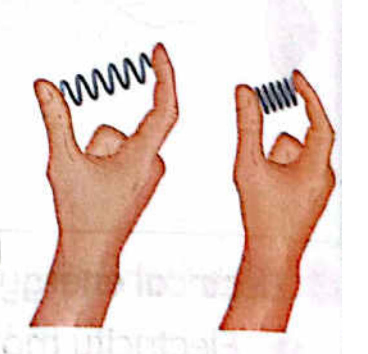


2 Chemical potential energy

» A battery stores chemical potential energy.

« البطارية تخزن بداخلها طاقة وضع كيميائية.





» A compressed spring stores potential energy in it, and it can be changed into kinetic energy when you leave it.

« الزنبرك يخزن بداخله طاقة وضع قد تتحول إلى طاقة حركة عند تركه.



» • The chemical energy stored in a battery isn't used until the battery is connected to any device.

Potential energy depends on:

1. The <u>height</u> of the body.
2. The <u>mass</u> of the body..

تعتمد طاقة الوضع على ارتفاع الجسم وكتلته.

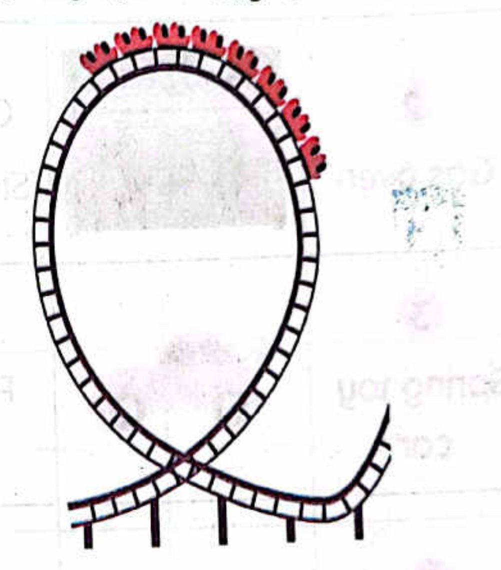
Activity 8 Types of Energy

- Energy is found everywhere around us.
- All forms of energy are classified into potential or kinetic energy.

1. **Energy can be transferred.**
when you kick the ball, energy transfers from your leg to the ball.
الطاقة يمكن أن تنتقل. عند ركل الكرة تنتقل الطاقة الحركية من قدمك إلى الكرة.

2. **Energy can be transformed (changed) from one form to another.**
Potential energy changes to kinetic energy and vice versa as with a roller coaster.
تتحول صور طاقة الوضع إلى طاقة حركة والعكس صحيح.







Think With Me

Tool	Energy Used	Energy Produced
1 Electric fan	....	....
2 Electric lamp	....	....

Energy Transformations
تحولات الطاقة

» Potential energy can be changed easily into kinetic energy.

يمكن تحويل صور طاقة الوضع إلى صور طاقة الحركة بسهولة. «

Tool	Figure	Energy used	Energy produced
1. Flashlight (Torch)		Chemical energy (Stored in a battery)	Light energy Thermal energy
2 Gas oven		Chemical energy (Stored in natural gas)	Thermal energy
3 Spring toy car		Potential energy	Kinetic energy
4 Real Car		Chemical energy (Stored in gasoline)	Kinetic energy Thermal energy Sound energy
5 Spring		Potential energy	Kinetic energy
6 Food		Chemical energy (Stored in food)	Kinetic energy



Tool	Energy Used	Energy Produced
1 Electric lamp	…………	…………
2 Radio	…………	…………
3 TV	…………	…………
4 Electric iron	…………	…………
5 Hand bell	…………	…………
6 Electric bell	…………	…………
7 Roller coaster	…………	…………
8 Washing machine	…………	…………



Lesson 4

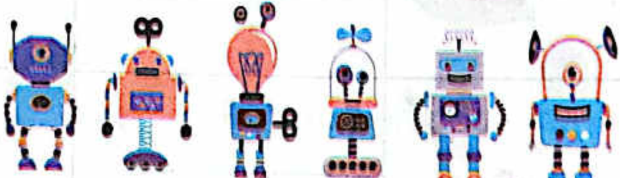
Activity 11 Easy Life Tool

Robot (With batteries)

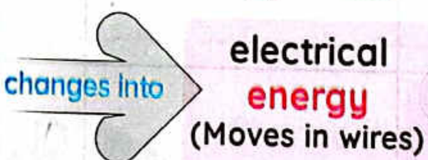
Robots were invented to make tasks easier:

1. Chemical energy (stored in the battery) is converted into electrical energy.
2. Electrical energy is converted into kinetic energy to do tasks.





Chemical energy (Stored in a battery)



changes into

electrical energy (Moves in wires)



changes into

kinetic energy (Makes the robot move)

Law of Conservation of Energy

قانون بقاء الطاقة

Energy is neither created nor destroyed, but it can be changed from one form to another.

الطاقة لا تفنى أو تستحدث من العدم ولكن يمكن تحويلها من صورة لأخرى.





on Lessons 3 & 4

1 Choose the correct answer:

1. A truck stores .... at the top of the ramp.
   a. kinetic b. chemical c. thermal d. potential
2. .... energy is stored in a compressed spring.
   a. Gravitational b. Chemical c. Potential d. Thermal
3. Any device operated by a battery stores .... potential energy.
   a. gravitational b. chemical c. elastic d. thermal
4. All of the following are forms of kinetic energy, except .... energy.
   a. sound b. light c. chemical d. thermal
5. Chemical energy exists in all the following, except ....
   a. an apple on the ground b. a gas oven
   c. a flashlight d. a spring toy car
6. Scientists classify energy into .... energy and .... energy.
   a. potential - kinetic b. thermal - electrical
   c. sound - light d. chemical - gravitational
7. The potential energy of any object depends on the ....
   a. object's mass and speed b. object's mass and height
   c. object's speed and height d. no correct answer
8. An object's mass affects its ....
   a. potential energy only b. kinetic energy only
   c. both kinetic and potential energies
   d. neither kinetic nor potential energies
9. When the moving object ...., its kinetic energy decreases.
   a. moves faster b. moves slower
   c. stops suddenly d. moves with the same speed
10. In a ...., chemical energy is changed into light energy.
    a. gas oven b. clock
    c. flashlight d. normal car

11. The vibration of water particles during boiling of water is considered ______ .
   a. thermal potential energy
   b. chemical kinetic energy
   c. chemical potential energy
   d. thermal kinetic energy

12. The source of energy in this robot is ______ energy.
   a. electrical
   b. solar
   c. thermal
   d. chemical

13. What is the correct order for the energy transformation in a robot?
   a. Chemical energy → kinetic energy → electrical energy
   b. Kinetic energy → chemical energy → electrical energy
   c. Chemical energy → electrical energy → kinetic energy
   d. Kinetic energy → kinetic energy → chemical energy

2 Write the scientific term:

1. The energy stored in the object due to its position. (______)
2. The energy that an object gains due to its motion.(______)
3. The energy stored in a compressed spring. (______)
4. The energy stored in batteries. (______)
5. A form of kinetic energy that transfers through wires.(______)
6. A form of kinetic energy that can be seen. (______)
7. A form of kinetic energy that can be heard by the ear.(______)
8. A form of kinetic energy that causes vibration of water particles during boiling. (______)
9. The source of energy that exists in normal vehicles (cars). (______)
10. The source of energy that exists in gas ovens. (______)
11. The energy produced in a gas oven. (______)
12. The energy produced from a battery. (______)
13. A device that changes electrical energy into sound energy.(______)

3 Put (✓) or (✗):

1. An apple on the ground stores chemical potential energy. (   )
2. Falling objects have both kinetic and potential energies.(   )
3. A static object on the ramp has potential energy only. (   )
4. An object's mass affects its kinetic and potential energies.(   )
5. As an object's height increases, its kinetic energy increases.(   )
6. Vibration of water particles during boiling is considered a form of chemical energy. (   )
7. When an apple falls from a tree, its kinetic energy increases. (   )
8. Movement of electricity in wires is considered a form of kinetic energy. (   )
9. Sound and light energies transfer in the air in the form of waves.(   )
10. Thermal energy is the source of energy in a gas oven. (   )
11. All forms of energy can be classified into two types. (   )
12. Energy can't be created or destroyed. (   )
13. Energy can't be transferred from one object to another. (   )
14. Electric fans change kinetic energy into electrical energy. (   )

4 Complete the following sentences:

1. The stored .... energy in a battery is changed into .... in the flashlight.
2. Energy can't be .... or ...., but it can be .... from one form to another.
3. When you push the ball in a handball match, ... energy transfers from your .... to ....
4. .... and .... are forms of potential energy.
5. ...., ... and .... are forms of kinetic energy.
6. .... energy transfers in air in the form of .... and causes sight.
7. When an object moves down, its .... energy increases as its speed ....

8. .... energy causes the vibration of water particles during ....
9. An electric fan converts .... energy into .... energy.
10. An electric lamp is operated by .... energy, while it produces .... energy.
11. A washing machine .... kinetic and sound energies, while it is .... by electrical energy.
12. All forms of energy can be classified into .... and .... energies.
13. Energy is neither .... nor ...., but it can be .... from one form to another.

5 Cross out the odd word:

1. Vegetables – Normal Car – Electric heater – Gas oven
2. Sound energy – Light energy – Thermal energy – Chemical energy

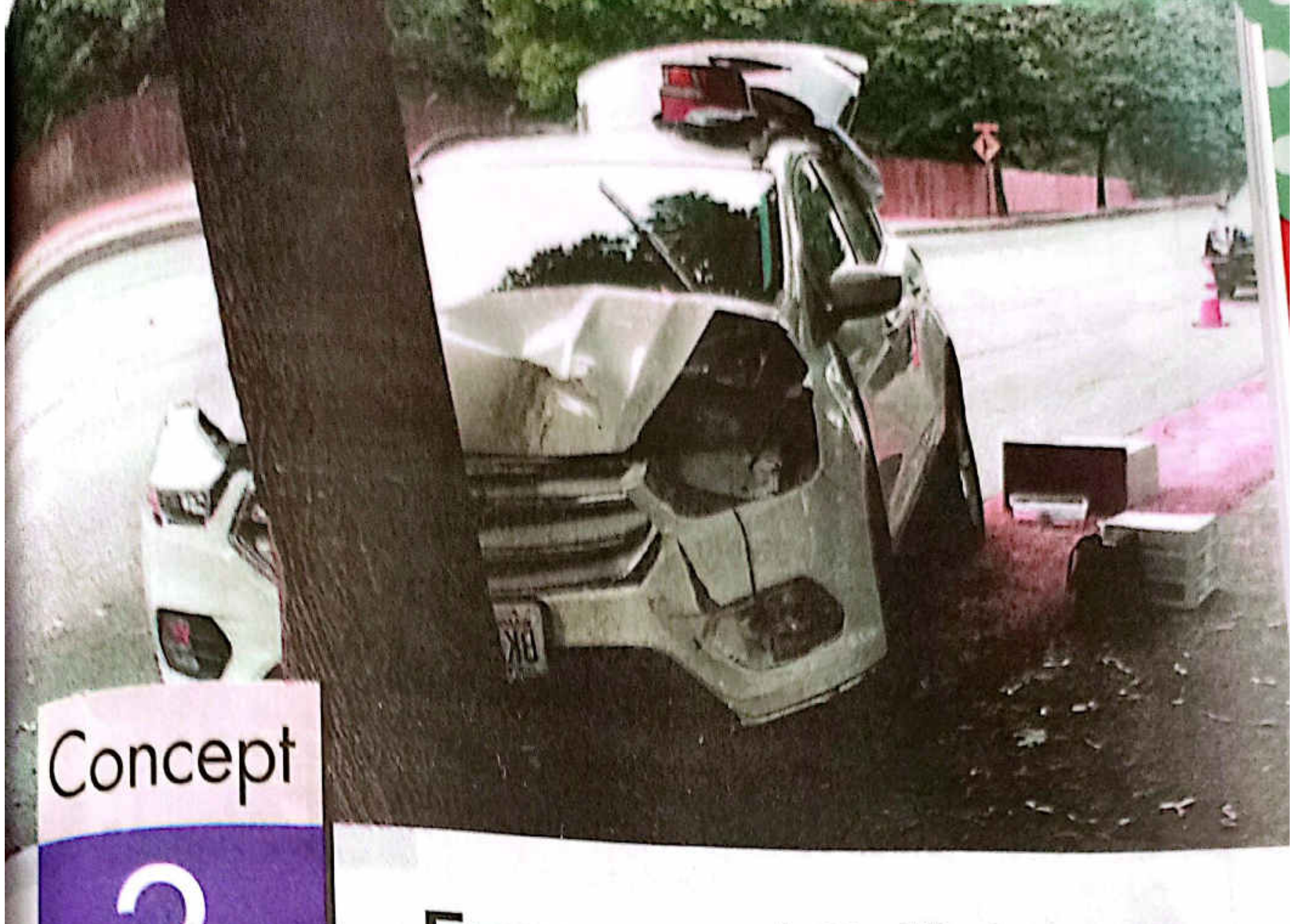
6 Study the following figures, then classify them into kinetic or potential energies:

7 Give reasons for:

1. Electrical energy is considered a form of kinetic energy.
....
2. TV produces different kinds of energy.
....

8 What happens if:

1. You operate an electric lamp.
....
2. You operate an electric fan.
....



Concept 3

Energy and Collisions

In this concept, we are going study:

- Collision.
- Examples of collision:
  a. Wrecking ball b. Cricket
- Safety equipment during collision:
  a. Seatbelt b. Airbag
- Basics of speed.
- How to measure an object's speed.
- Comparing the speed of different objects.
- Relationship between speed and kinetic energy.
- Effects of mass, speed and force on collision.
- Sliding on an inclined ramp.
- Energy conservation in Newton's cradle.

Key Vocabulary

- Collision
- Speed
- Mass

Lesson 1

Activity 1 Can You Explain?

Wrecking Ball كرة الهدم

- It is a very heavy steel ball that swings on a cable.
- كرة فولاذية ثقيلة معلقة بكابل.
- It is used by construction workers to knock down walls or parts of buildings.
- تساعد عمال البناء على تكسير أجزاء من المباني.



What happens to objects when they collide 

Heavy fast object

Light slow object

High energy causes more damage than low energy

» Heavy objects cause more damage than light objects.

» Fast objects cause more damage than slow objects.

Activity 2 Collision

Collision in Cricket
التصادم في لعبة الكريكيت

- Cricket is a popular game all over the world.
- لعبة الكريكيت هي لعبة شعبية في جميع أنحاء العالم.
- The player holds a wooden bat to hit the ball.
- يمسك اللاعب بمضرب خشبي لضرب الكرة.

When the player hits the ball: عندما يضرب اللاعب الكرة:



- Kinetic energy transfers from the bat to the ball.
- سوف تنتقل الطاقة الحركية من المضرب إلى الكرة.
- The speed of the ball increases.
- The ball returns back in a different direction.
- تزداد سرعة الكرة وتعود الكرة في اتجاه مختلف.
- Collision always makes a popping sound.
- ينتج عن الاصطدام دائمًا صوت.

Check your understanding



Study the following figure, then put (✓) or (X):

1. Energy transfers from the ball to the player's foot. ( )
2. The ball gains potential energy. ( )
3. The direction of the ball changes. ( )
4. The speed of the ball decreases. ( )
5. The boy does work. ( )



Activity 3 Watching Objects Collide



» What happens when a car stops suddenly?

« ماذا يحدث عندما تتوقف السيارة فجأة؟

- The driver's body continues to move forward. Because moving objects stay in motion until something stops them.

يستمر جسم السائق في التحرك للأمام.

حيث تظل الأجسام المتحركة في حالة حركة حتى يوقفها شيء ما.



Safety Equipment During Collision
معدات السلامة أثناء التصادم

1 Seatbelt — حزام الأمان



It's used in cars to keep the driver and the passengers from moving **forward** during a collision (when the car stops suddenly).

يستخدم لمنع جسم السائق والركاب من التحرك للأمام وقت التصادم.





2 Airbag
الوسادة الهوائية

Description
الوصف

» It is made of **thin nylon material** folded into the **steering wheel**, **dashboards**, **seats** or **doors**.

« تصنع الوسادة الهوائية من النايلون الخفيف وتطوى داخل عجلة القيادة أو لوحة التابلوه أو المقعد أو الأبواب.

Idea
فكرة عملها

During collision:

» The airbag **inflates** automatically because the sensor of the car detects a crash.

« تنتفخ الوسادة الهوائية تلقائيًا بواسطة مستشعرات السيارة عند حدوث التصادم.

After collision:

» The airbag **deflates** as fast as it inflates, because it has holes and vents, so the driver can get out of the car.

تنكمش الوسادة الهوائية بنفس سرعة انتفاخها لوجود ثقوب وفتحات بها حتى تسمح للشخص بالخروج من السيارة.

» **Sensors** tell the airbag to inflate and fill it with gas to provide a soft cushion.

تخبر المستشعرات الوسادة الهوائية بالانتفاخ وتعبئتها بالغاز لتصبح ملساء الملمس.

Importance
الأهمية

» It slows the speed of the driver when his body moves forward.

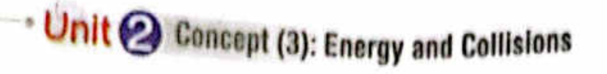
« خفض سرعة حركة الجسم للأمام أثناء التصادم.

» It absorbs the energy of the car during collision.

« امتصاص طاقة السيارة أثناء التصادم.





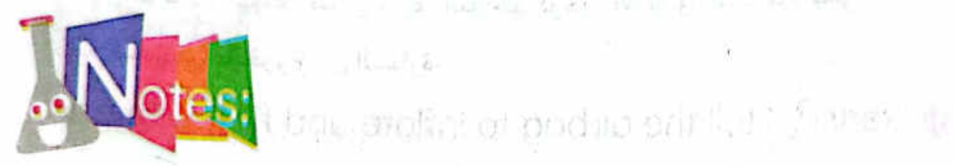


Collision Between Trains and Cars



When a train collides with a car: عندما يصطدم القطار بالسيارة:

- The train causes more damage than the car. يتسبب القطار في أضرار أكثر من السيارة.
- The train has a higher energy than the car. القطار لديه طاقة أعلى من السيارة.
- The energy transfers from the train to the car. تنتقل الطاقة من القطار إلى السيارة.



- **Heavy** moving objects always have **big** engines.
- **Light** moving objects always have **small** engines.
- Car airbags cannot protect people in severe collisions with trains.
- لا يمكن للوسائد الهوائية في السيارات حماية الأشخاص عند التصادم الشديد مع القطارات.









1 Choose the correct answer:

1. When two cars crash together, ... is transferred between them.
   a. mass b. time c. energy d. distance
2. A .... has the biggest engine.
   a. truck b. car c. motorbike d. bike
3. The .... has the lowest kinetic energy.
   a. fastest and lightest object b. slowest and lightest object
   c. fastest and heaviest object d. slowest and heaviest object
4. .... moving object has the biggest engine.
   a. The fastest b. The slowest
   c. The lightest d. The heaviest
5. The moving .... has no engine.
   a. truck b. motorbike c. bike d. vehicle
6. A .... is used by construction workers to knock down buildings.
   a. winch b. truck
   c. crane d. wrecking ball
7. When the wrecking ball hits a building, ...
   a. kinetic energy transfers from the building to the ball
   b. kinetic energy transfers from the ball to the building
   c. sound energy transfers from the ball to the building
   d. thermal energy transfers from the ball to the building
8. When Sara hits the tennis ball, the ball's speed .... in .... direction.
   a. increases – the same b. decreases – a different
   c. increases – a different d. decreases – the same

9. In cricket, when Adam hits the ball, ...
   a. the ball moves in the same direction
   b. the ball speed decreases
   c. the kinetic energy is transferred from the ball to the bat
   d. a part of the kinetic energy is changed to sound energy

10. When the driver stops suddenly, all the passengers will move ....
   a. upward b. forward c. backward d. downward

11. The airbag inflates .... collision, while it deflates fast .... collision.
   a. before - after b. during - before
   c. before - during d. during - after

12. The airbag deflates after collision to ....
   a. avoid another accident b. avoid being injured
   c. allow the driver to move the car
   d. allow the driver to get out of the car

13. The airbag is made of .... material, while the wrecking ball is a .... ball.
   a. fiber - steel b. nylon - iron
   c. nylon - steel d. rubber - iron

14. .... tell the airbag to inflate and fill it with gas to provide a soft cushion.
   a. Brakes b. Sensors
   c. Gas pedals d. Speedometers

15. The .... slows the speed of the driver when his body moves forward.
   a. steering wheel b. seatbelt c. airbag d. sensor

2 Put (✓) or (✗):

1. Light objects cause less damage than heavy objects. (   )
2. Fast objects cause less damage than slow objects. (   )
3. A static car has more kinetic energy than a moving car. (   )
4. In cricket, the speed of the ball increases when the player hits it. (   )

5. When the player hits the ball, energy transfers from the ball to the bat. ( )
6. After collision, the airbag deflates as fast as it inflates. ( )
7. The seatbelt is used to keep the driver from moving backward during collision. ( )
8. The airbag absorbs the energy of the car after collision. ( )
9. A truck has a big engine because it is a heavy object and has low energy. ( )
10. Seatbelts and airbags save thousands of lives during accidents. ( )
11. Car airbags cannot protect people in severe collisions with trains. ( )

3 Write the scientific term:

1. A famous game in which the player hits the ball with a wooden bat. (..........)
2. A heavy steel ball swings on a cable used to knock down buildings. (..........)
3. The material that is used in making airbags. (..........)
4. They work on starting the airbag inflation during a collision. (..........)
5. It slows the speed of the driver from moving forward during collision. (..........)
6. It prevents the driver's body from moving forward during collision. (..........)
7. It absorbs the energy of the car during collision. (..........)

4 Use the following words to complete:

(forward - backward - same - opposite - more - less - plastic - nylon)

1. Light objects cause .... damage than heavy objects.
2. Fast objects cause .... damage than slow objects.
3. When the player hits the ball, it moves in the .... direction.

4. The seatbelt keeps the driver's body from moving ______ during collision.
5. The airbag is made up of ______ material folded inside the steering wheel.

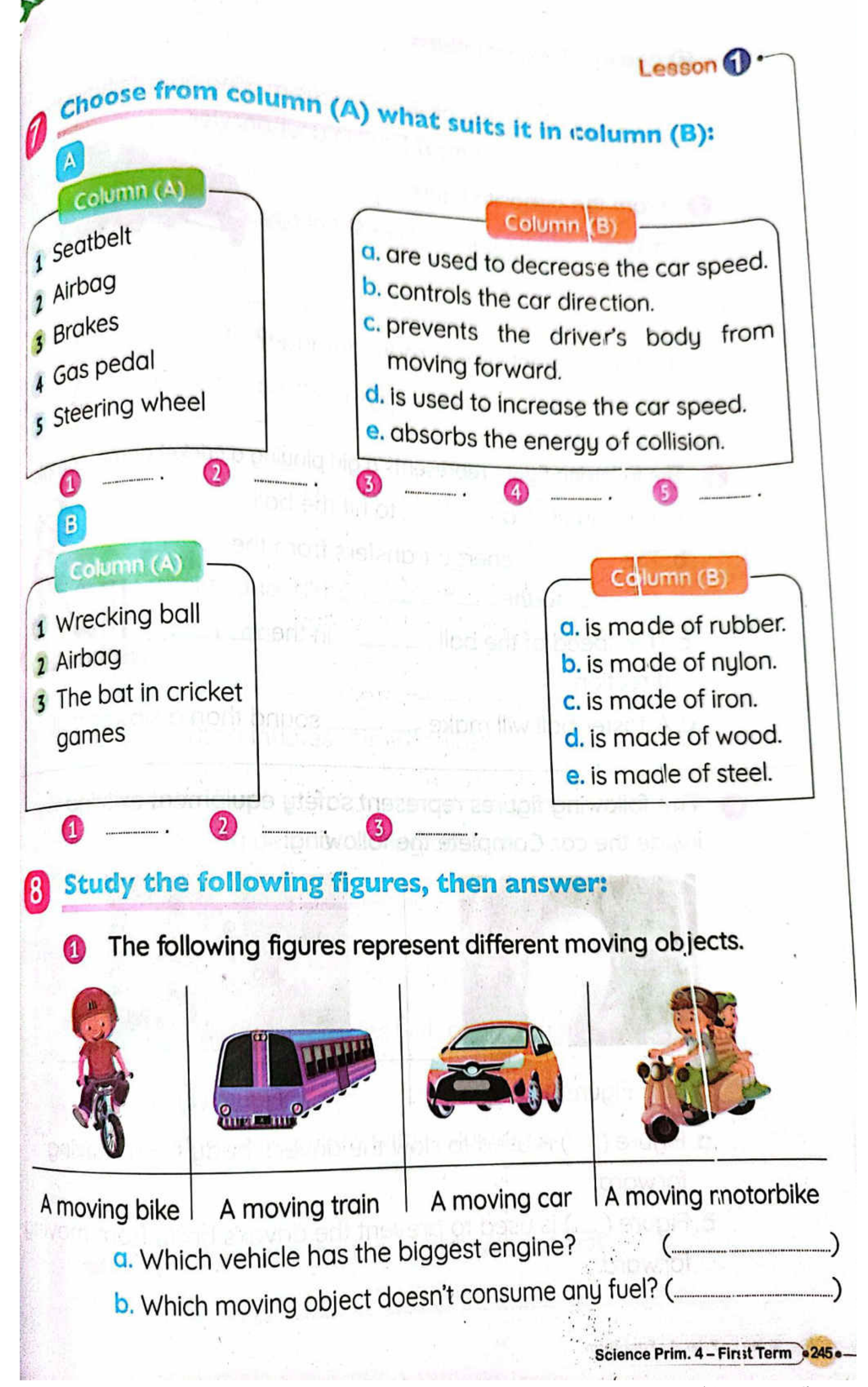
5 Complete the following sentences:

1. During the collision of two moving objects, ______ transfers between them.
2. A truck has an engine ______ than a motorbike engine.
3. The speed of a static car is ______ than the kinetic energy of a moving bike.
4. Trucks cause more damage than ______ and less than ______ during collision.
5. ______ objects and ______ objects cause great damage.
6. ______ ball is used by construction workers to ______.
7. In cricket, the energy transfers from the ______ bat to the ______ and its speed ______.
8. The airbag is manufactured from ______ material folded inside the ______, ______ and ______.
9. ______ decreases the speed of the driver from moving forward during collision, while ______ prevent the driver's body from moving forward.
10. During collision, the airbag ______, while it deflates fast ______ collision.

6 Choose from column (A) what suits it in both columns (B) & (C):

Column (A)	Column (B)	Column (C)
1 A moving car	a. has no kinetic energy.	a. has no engine.
2 A static truck	b. has the highest kinetic energy.	b. has the biggest engine.
3 A moving bike	c. has the lowest kinetic energy.	c. has the smallest engine.

1. ______ . 2. ______ . 3. ______ .



7 Choose from column (A) what suits it in column (B):

A

Column (A)	Column (B)
1 Seatbelt	a. are used to decrease the car speed.
2 Airbag	b. controls the car direction.
3 Brakes	c. prevents the driver's body from moving forward.
4 Gas pedal	d. is used to increase the car speed.
5 Steering wheel	e. absorbs the energy of collision.

1 .... 2 .... 3 .... 4 .... 5 ....

B

Column (A)	Column (B)
1 Wrecking ball	a. is made of rubber.
2 Airbag	b. is made of nylon.
3 The bat in cricket games	c. is made of iron.
	d. is made of wood.
	e. is made of steel.

1 .... 2 .... 3 ....

8 Study the following figures, then answer:

1. The following figures represent different moving objects.

A moving bike	A moving train	A moving car	A moving motorbike

a. Which vehicle has the biggest engine? (..................)

b. Which moving object doesn't consume any fuel? (..................)

c. Do you think that all the previous moving objects have the same kind of energy? Explain your answer.

2 From the opposite figure.



a. Which object has the lowest energy and why?

____

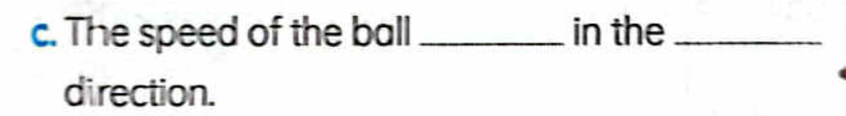
b. Which object causes more damage?

____

3 The following figure represents a girl playing a cricket game, complete:

a. The girl uses a ________ to hit the ball.

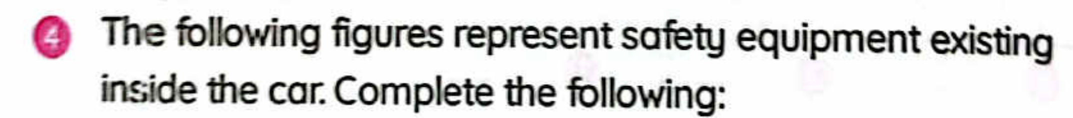
b. The ________ energy transfers from the ________ to the ________ .



c. The speed of the ball ________ in the ________ direction.



d. A faster ball will make ________ sound than a slower ball.



4 The following figures represent safety equipment existing inside the car. Complete the following:



Figure (1)



Figure (2)

a. Figure (___) is used to slow the driver's body from moving forward.

b. Figure (___) is used to prevent the driver's body from moving forward.

c. Figure (1) is folded inside the ...., ... or .... and it contains .... that is responsible for inflating it during collision.

d. Figure (1) inflates .... collision, while it .... after collision.

9 Give reasons for:

1. During collision, the truck causes more damage than the car.

....

2. During collision, a fast car causes more damage than a slow car.

....

3. Seatbelts and airbags are from the most important safety means in cars.

....

4. The airbag inflates during collision.

....

5. The airbag deflates during collision.

....

10 What happens if:

1. A heavy object collides with a light object.

....

2. A fast object collides with a slow object.

....

3. The player hits the tennis ball with the bat.

....

Lesson 2

Activity 4 Energy and Collision

Collision التصادم • It is the crashing of two objects together.

هو اصطدام جسمين معًا.

When Two Cars Collide عند تصادم سيارتين





- An energy transfer occurs. يحدث انتقال للطاقة.
- Changes of energy occur. يحدث تحولات للطاقة.

Example

- What happens when a boy runs fast and hits a traffic sign?





- The boy stops moving forward.
- The boy may get injured.
- The traffic sign may vibrate (wobble).

قد يتوقف الولد عن الحركة للأمام - قد يتعرض للإصابة - قد تهتز إشارة المرور

- Kinetic energy transfers from the boy to the traffic sign, so it vibrates.

تنتقل الطاقة الحركية من الولد لإشارة المرور فتهتز إشارة المرور.

- Some of the kinetic energy changes to sound and heat energies during collision.

يتحول جزء من الطاقة الحركية إلى طاقة صوتية وحرارية أثناء التصادم.



Activity 5 Basics of Speed

Basics of Speed مبادئ السرعة

» Speed is a measurement that indicates how fast objects move.

« السرعة كمية فيزيائية تعبر عن مدى سرعة الجسم.

» The direction of the moving object doesn't affect the speed.

« اتجاه الحركة لا يؤثر على قيمة السرعه.



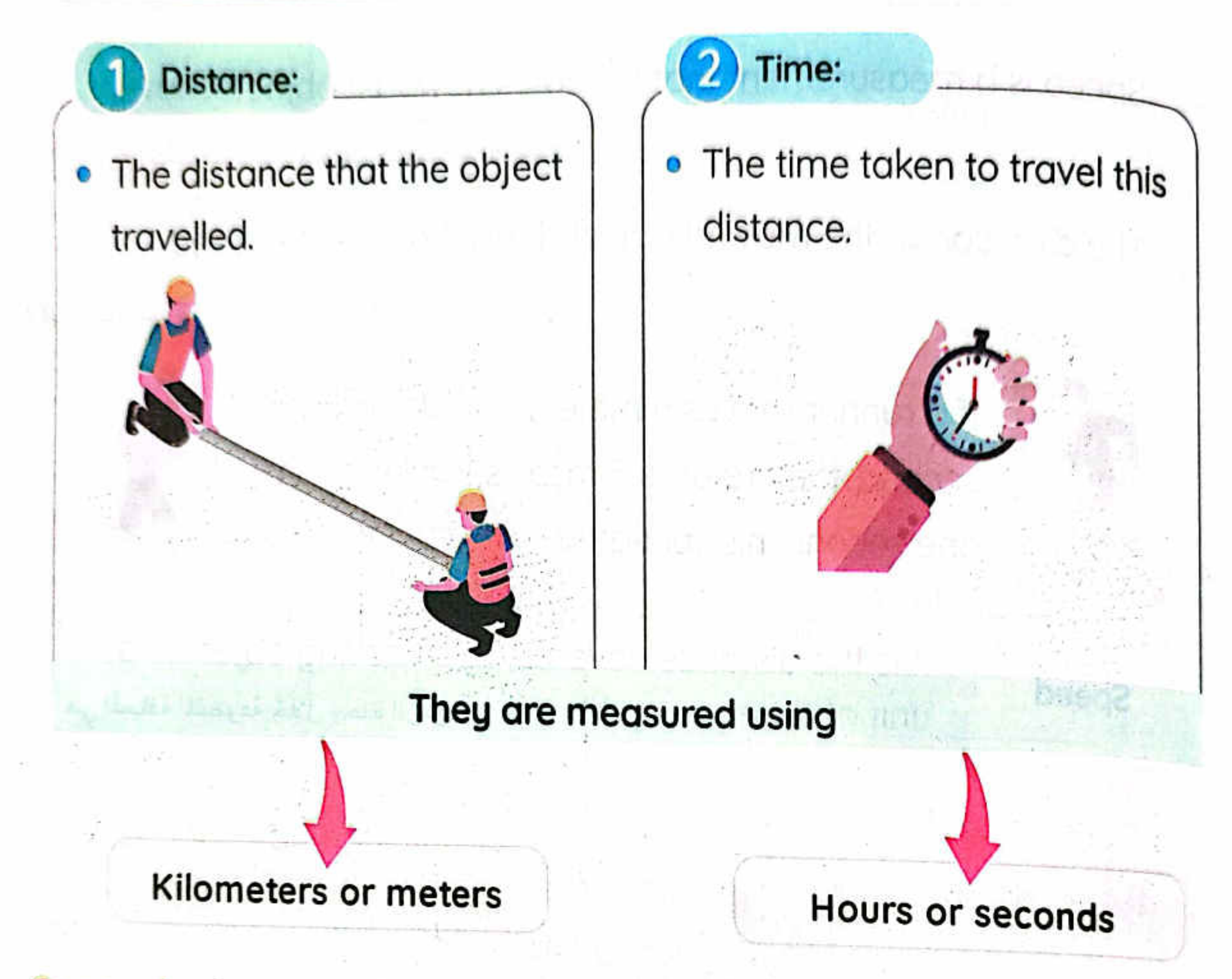
If a runner moves 5 meters forward in one second, then returns 5 meters backward in one second, his speed remains constant.



Speed ● It is the distance covered by a moving object in a unit of time. هي المسافة المقطوعة خلال وحدة الزمن.

How to Measure an Object's Speed

First, we must know:



1 Distance:

- The distance that the object travelled.

2 Time:

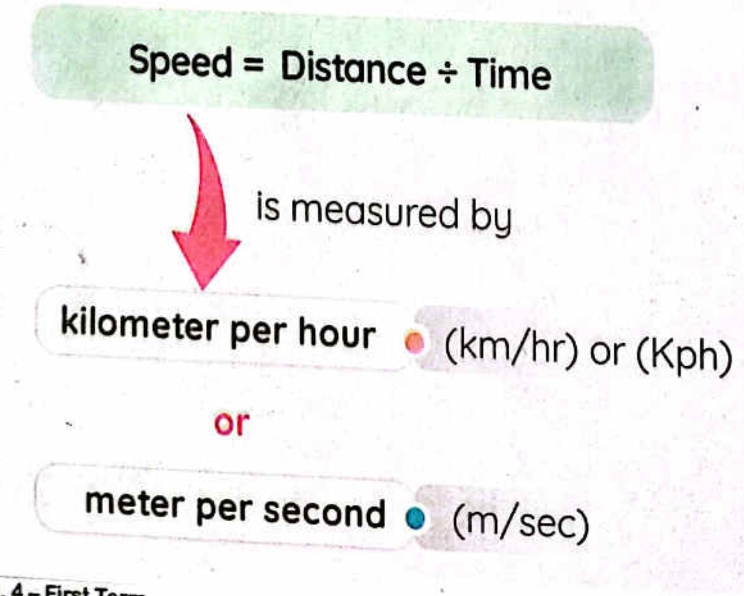
- The time taken to travel this distance.

They are measured using

Kilometers or meters

Hours or seconds

Second, we can calculate the object's speed using the following rule:



Speed = Distance ÷ Time

is measured by

kilometer per hour (km/hr) or (Kph)

or

meter per second (m/sec)

Problems

Problem 1:

» Calculate the speed of a runner who runs 240 m in 60 seconds.



- Distance = 240 meters.

  Time = 60 seconds.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{240}{60} = 4 \text{ m/sec.}$$

Problem 2:

» Calculate the speed of a car that covers 300 km in one hour.



- Distance = 300 kilometers.

  Time = 1 hour.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{300}{1} = 300 \text{ km/h.}$$

Problem 3:

» If Kenzy rides a bike and covers 150 m in 15 seconds to reach the supermarket, calculate the speed of the bike.



- Distance = ... meters.

  Time = ... seconds.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{\ldots}{\ldots} = \ldots\ldots \text{ m/sec.}$$

Problem 4:

From the following figures, which car is faster?

The green car moves 10 meters in 2 seconds.



The red car moves 20 meters in 4 seconds.



Solution:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{10}{2}$$

$= 5$ m/sec.

Solution:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{20}{4}$$

$= 5$ m/sec.

The two cars have the same speed.

Problem 5:

From the following figures, which car is faster?

The gray car moves 50 meters in 2 seconds.



The white car moves 60 meters in 2 seconds.



Solution:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{\dots}{\dots}$$

= .... m/sec.

Solution:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{\dots}{\dots}$$

= .... m/sec.

Comparing the Speed of One Body to Another

مقارنة سرعة جسم بسرعة جسم آخر

Relationship Between Speed and Distance (At the same time)





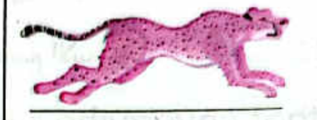
The runner covers 100 meters in 5 seconds.	The car covers 500 meters in 5 seconds.

- Runner's speed = $\frac{100}{5}$ = 20 m/sec.
- Car's speed = $\frac{500}{5}$ = 100 m/sec.

- The car has *higher speed* because the car covers *longer distance* in the *same time*

الأسرع هو من قطع مسافة أكبر في نفس الفترة الزمنية.

Relationship Between Speed and Time (At the same distance)





A cheetah covers 50 meters in 5 seconds.	A tutrle covers 50 meters in 100 seconds.

- Cheetah's speed = $\frac{50}{5}$ = 10 m/sec.
- Turtle's speed = $\frac{50}{100}$ = 0.5 m/sec.

- Cheetah has *higher speed* because the tutrle covers the *same distance* in a *shorter time*

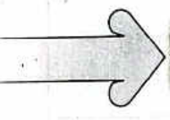
الأسرع هو من قطع نفس المسافة في أقل وقت.

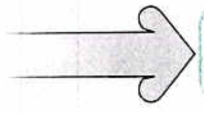
Speed of moving objects depends on

1. The distance covered by the object.
2. The time taken to cover this distance.

To compare the speed of two moving objects:

1. The object that covers a longer distance in the same time has higher speed. الجسم الذي يقطع أكبر مسافة في نفس الزمن هو الجسم الأسرع.
2. The object that covers the same distance in a shorter time has higher speed. الجسم الذي يقطع نفس مسافة في زمن أقل هو الجسم الأسرع.

As distance increases  Speed increases

As time increases  Speed decreases

Which object moves faster?



1	The 1st runner travels 6 kilometers in 1 hour.	
	The 2nd runner travels 9 kilometers in 1 hour.	

2	The 1st car travels 1,000 meters in 5 seconds.	
	The 2nd car travels 1,000 meters in 8 seconds.	





Activity 6 The Effect of Speed on Collision

Relationship Between Speed and Kinetic Energy

- As an object's speed increases, its kinetic energy increases (direct relationship).
  كلما زادت سرعة الجسم زادت طاقته الحركية (العلاقة طردية).
- The force exerted in an accident depends on the speed and the direction of the two cars.
  القوة المؤثرة في الحادثة تعتمد على سرعة السيارتين واتجاههما.

1 Speed of the two cars سرعة السيارتين

Fast Moving Objects الأجسام السريعة	Slow Moving Objects الأجسام البطيئة
• They have more energy. تمتلك طاقة أكبر.	• They have less energy. تمتلك طاقة أقل.
• When they hit another object, they exert more force. عند التصادم تكون قوتها أكبر.	• When they hit another object, they exert less force. عند التصادم تكون قوتها أصغر.
• This force causes a big damage that cannot be repaired. تسبب ضررًا أكبر لا يمكن إصلاحه.	• This force causes a small damage that can be repaired. تسبب ضررًا أصغر يمكن إصلاحه.





2 Direction of the two cars اتجاه السيارتين



Two cars move in the same direction

السيارتان تتحركان في نفس الاتجاه

- Damage will be less severe.

الأضرار أقل.



Two cars move in opposite directions

السيارتان تتحركان في اتجاهين مختلفين

- Damage will be more severe.

الأضرار كبيرة.

When a fast object hits another: عندما يصطدم جسم سريع بآخر:

- Kinetic energy transfers to the other object.
- Some of the extra energy is transferred in the form of heat, light or sound.

تنتقل طاقة الحركة للجسم الآخر وتتحول بعض الطاقة الزائدة إلى طاقة حرارية أو صوتية أو ضوئية.

A fast rubber ball makes a louder sound when it is hit by a bat than a slower ball.

الكرة المطاطية السريعة تصدر صوتًا أعلى من الكرة البطيئة عند ضربها بالمضرب.



Driving fast is very dangerous.

القيادة السريعة خطيرة جدًا.





Activity 7 Racing Downhill

Activity: The Relationship Between Speed and the Angle of the Inclined Ramp



Tools:

Six books - toy car - scissors - stopwatch - metric ruler - paper cup - cardboard roll

Steps:

1. Put one end of the cardboard roll on the top of two books, and the other end of it resting on the ground.
2. Record the number of books that you are used in the table.
3. Roll the toy car down the tube, use the stopwatch to determine the time and also use the metric ruler to determine the distance covered.
4. Repeat the previous steps by increasing the number of books and record these results in a table.

Results:

Number of Books	2	4	6
Time (Seconds)	8	4	2
Distance (Meters)	2	4	8

Conclusion:

» As the height of the ramp (angle of the inclined ramp) increases, the speed of the object increases and its kinetic energy increases.

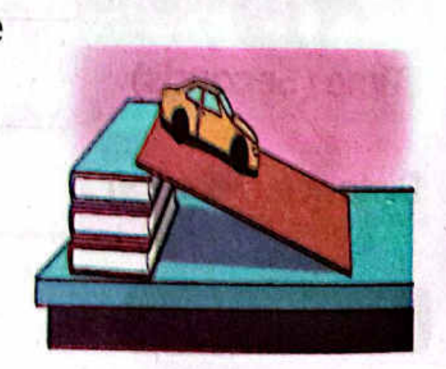
Relationship Between an Object's Speed and the Height of the Ramp

» As the height of the ramp (angle of the inclined ramp) increases, the speed of the object increases and its kinetic energy increases.

« تزداد سرعة الجسم وطاقة حركته بزيادة زاوية ميل السطح المائل (ارتفاع السطح المائل).



Study the following figure, then choose the correct answer:



1. By increasing the number of books, the car covers a ....
   (longer distance - shorter distance)

2. By decreasing the number of books, the car's speed ....
   (increases - decreases)



1 Choose the correct answer:

1. .... energy is transferred between two objects during a collision.
   a. Sound b. Thermal c. Electrical d. Kinetic
2. All these kinds of energy exist during collision, except .... energy.
   a. sound b. thermal c. electrical d. kinetic
3. Collision between moving objects always produces .... energy.
   a. sound b. potential c. electrical d. chemical
4. During collision, all the following happen, except ....
   a. energy transfer b. energy changes
   c. energy destruction d. damage
5. When a fast runner collides with a traffic sign, all the following happen, except ....
   a. electric energy is produced b. sound energy is produced
   c. the runner stops d. the traffic sign vibrates
6. During collision, kinetic energy transfers from the .... object to the .... object.
   a. slow – fast b. heavy – light
   c. weak – strong d. static – moving
7. .... is a measurement of how fast or slow an object moves.
   a. Distance b. Time c. Speed d. Force
8. To measure the speed of an object, we need to know ....
   a. distance and mass b. energy and time
   c. distance and time d. mass and time
9. To calculate the speed of a runner, we use the rule: ....
   a. speed = distance – time b. speed = distance × time
   c. speed = distance ÷ time d. speed = distance + time

10. The measuring unit of an object's speed is ....
    a. kg/hr
    b. hr/km
    c. second/meter
    d. meter/second

11. Which of the following measurements doesn't affect an object's speed?
    a. Force
    b. Direction
    c. Distance
    d. Time

12. A truck covers 400 meters in 20 seconds, so its speed equals ....
    a. 20 km/hr
    b. 30 m/sec
    c. 40 m/sec
    d. 20 m/sec

13. If the four cars have the same mass, which car has the highest kinetic energy?
    a. Car (A) covers 100 meters in 2 seconds
    b. Car (B) covers 200 meters in 2 seconds
    c. Car (C) covers 300 meters in 3 seconds
    d. Car (D) covers 200 meters in 1 second

14. If these objects move with the same speed, which object has the highest kinetic energy?
    a. Car
    b. Bike
    c. Truck
    d. Motorbike

15. Which accident causes a great damage that can't be repaired?
    a. Two slow cars collide in opposite directions.
    b. Two fast cars collide in the same direction.
    c. Two slow cars collide in the same direction.
    d. Two fast cars collide in opposite directions.

16. The effect of a collision depends on all the following factors, except the .... of the moving object.
    a. direction
    b. speed
    c. color
    d. mass

17. When two cars collide in opposite directions, ...
    a. the biggest car has high energy and causes less damage
    b. the slowest car has low energy and causes more damage
    c. the fastest car has high energy and causes less damage
    d. the smallest car has low energy and causes less damage

18. By using two books only in the following figure, the object's speed and its kinetic energy ....
    a. increases b. decreases
    c. becomes zero d. remains constant

19. The speed of the bike .... when it runs down inclined road.
    a. increases b. decreases
    c. remains constant d. becomes zero

20. As the angle of the inclined ramp decreases, the object's speed ....
    a. increases b. decreases
    c. remains constant d. becomes zero

2 Put (✓) or (X):

1. Collision between moving objects produces sound energy. ( )
2. All objects around us move at the same speed. ( )
3. An object covers the same distance in the same time but in the opposite direction, so its speed decreases gradually. ( )
4. Speed is the distance covered by the object multiplied by the time taken. ( )
5. The speed of a truck decreases when it takes longer time to cover the same distance. ( )
6. Distance covered by the object can be measured using meters or kilograms. ( )
7. The speed of the train that covers 160 kilometers in 2 hours is 80 km/hour. ( )
8. The speed of the car that covers 75 meters in 3 seconds is 25 km/hour. ( )
9. Car (A) is faster than car (B) if car (A) covers a longer distance than car (B) in the same time. ( )
10. The effect of a collision depends on the speed of the moving objects only. ( )
11. The effect of a collision increases if the two cars crashed in the same direction. ( )

12. Hitting a fast rubber ball makes a sound louder than a slow ball. ( )
13. The driver should drive as fast as possible to avoid any accident. ( )
14. As the height of the ramp decreases, the object reaches the ground faster. ( )
15. By increasing the angle of the inclined ramp, the kinetic energy decreases. ( )

3 Write the scientific term:

1. The crashing that occurs between two moving objects. (..........)
2. The energy that transferred during collision. (..........)
3. It is the distance covered by a moving object in a unit of time. (..........)
4. The measuring unit for the distance covered by an object. (..........)
5. The measuring unit for the time taken by an object to cover a distance. (..........)
6. The measuring unit for an object's speed. (..........)

4 Complete the following sentences:

1. The traffic sign .... when the boy hits it, because the kinetic energy transfers from the .... to the ...., and some of the kinetic energy is changed into .... and .... energies.
2. To measure the object's speed, we must know .... and ....
3. The distance covered by the object is measured by .... or ....
4. The time taken by the object to cover a distance is measured by .... or ....
5. .... and .... are used as measuring units of an object's speed.
6. If the object covers 6 meters in two seconds forward, then it returns backward covering the same distance in the same time, its speed equals ....

7. A bike covering 100 meters in 10 seconds is .... than another bike covering 150 meters in 30 seconds.
8. A fast object has .... kinetic energy than a slow object.
9. The .... ball makes a louder sound than a .... ball when we hit it with a bat.
10. The force exerted in collision depends on .... and ....
11. As the angle of the ramp increases, the moving object becomes ....on it.
12. By .... the angle of the inclined ramp, the speed of the object decreases.

5 Cross out the odd word:

1. Distance - Meter - kg - km
2. Distance - Time - Hour - Second

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Speed becomes zero	a. when an object covers a longer distance in the same time.
2 Speed increases	b. when an object covers the same distance in a longer time.
3 Speed decreases	c. when an object covers the same distance in the same time.
4 Speed remains constant	d. when an object covers zero distance in the same time.

1 .... 2 .... 3 .... 4 ....

7 Which object moves faster?

1	Car (A) travels a long distance in the same time.	
	Car (B) travels a short distance in the same time.	
2	Car (A) travels the same distance in a long time.	
	Car (B) travels the same distance in a short time.	

8 Study the following table, then complete:

	Car (A)	Car (B)	Car (C)	Car (D)
Distance (Meters)	200	200	100	100
Time (Seconds)	4	2	2	5

....

....

a. Car (....) is the fastest one, while car (....) is the slowest one.

b. Cars (....) and (....) move at the same speed.

9 Study the following figures, then answer the questions:

1. The following figures represent different collision situations, complete:

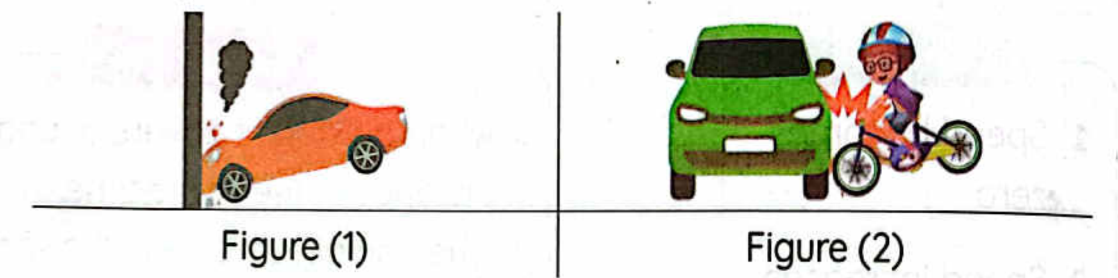


Figure (1) Figure (2)

a. In figure (1), kinetic energy transfers from the .... to the ....

b. In figure (2), kinetic energy transfers from the .... to the ....

c. Collision usually produces ....

2. Which figure represents the more severe damage and why?

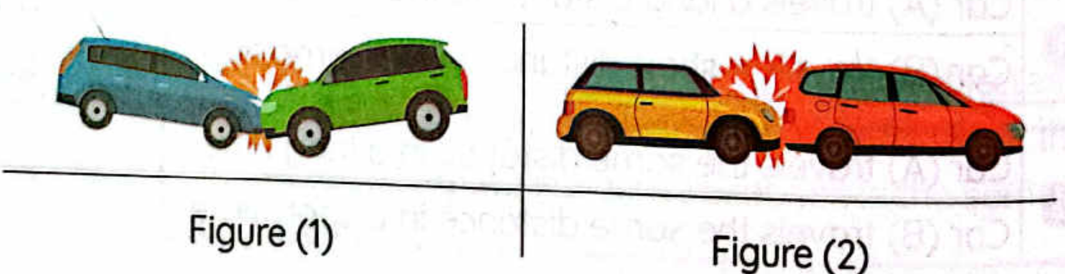


Figure (1) Figure (2)

9 Choose the correct word for the following sentences:
(faster - slower - increases - decreases - remains constant)

a. By using two books only instead of three books:
The object moves .... and its kinetic energy ....

b. By using four books instead of three books:
The object moves .... and its kinetic energy ....

10 Give reasons for:

1. The object's speed indicates how fast it moves.
....

2. Different kinds of energy exist during collision.
....

3. Driving fast is very dangerous.
....

11 What happens if:

1. Two moving cars crash into each other.
....

2. An object covers a longer distance in the same time.
....

3. An object covers the same distance in a longer time.
....

4. Two cars collide in opposite directions.
....

5. Two cars collide in the same direction.
....

6. The angle of the inclined ramp decreases.
(Concerning the kinetic energy of the object sliding on it)
....

Lesson 3

Activity 8 Speed and Collision

- By increasing the force on an object, its kinetic energy increases.
- By increasing the speed of an object, its kinetic energy increases.

Activity: To Show the Effect of Force and Speed of a Moving Object on Its Kinetic Energy

Steps	Observation
If the clay ball falls.  إذا سقطت كرة الصلصال.	The shape of the ball changes slightly. يتغير شكل الكرة قليلًا.
If the clay ball is thrown lightly.  عند رمي كرة الصلصال برفق.	The shape of the ball changes more. يتغير شكل الكرة بصورة أكبر.
If the clay ball is thrown strongly.  عند رمي كرة الصلصال بقوة.	The shape of the ball changes much more. يتغير شكل الكرة بصورة أكبر جدًا.

Conclusion

As the force and speed of a moving object increase, the kinetic energy increases during collision and more damage will happen to this object.

مع زيادة القوة والسرعة المؤثرة على الجسم المتحرك

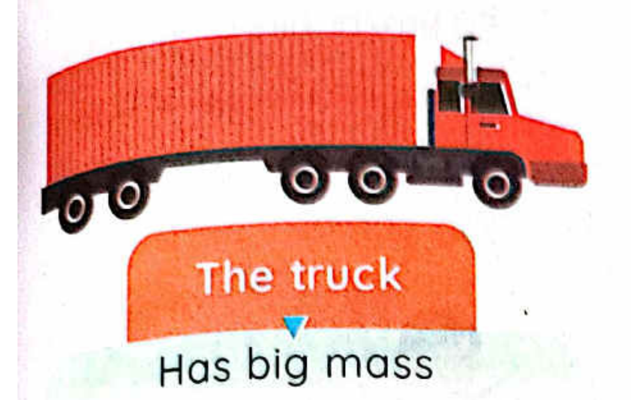
تزداد سرعة الجسم المتحرك وتزداد الطاقة الحركية له أثناء الاصطدام

وبالتالي سيحدث المزيد من الضرر لهذا الجسم.



Activity 9 The Effect of Mass on Collision

The Relationship Between the Mass of the Objects and Their Kinetic Energy

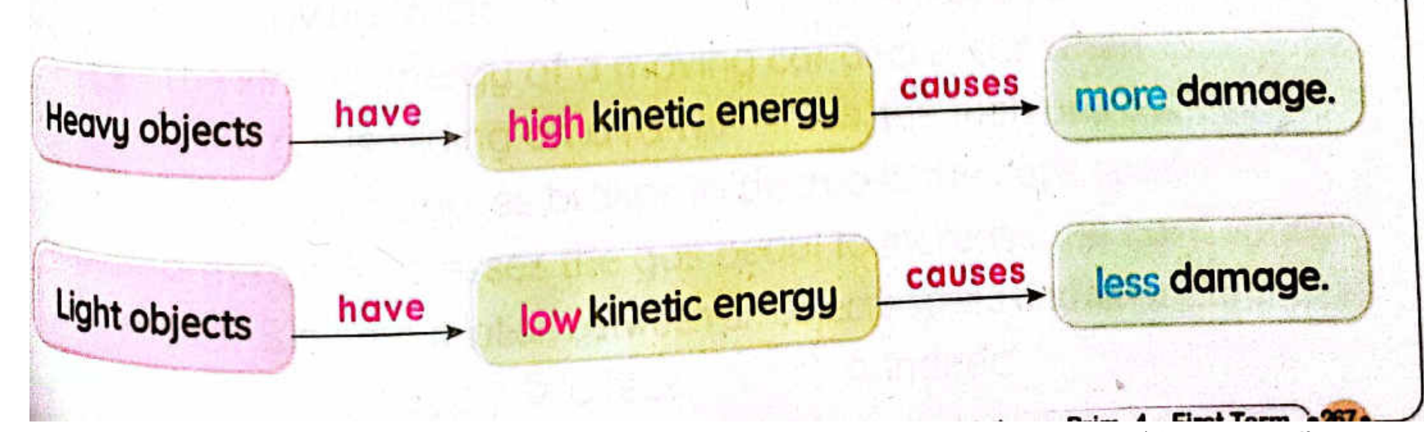




The truck	The car
Has big mass	Has small mass
Has a big engine	Has a small engine
Has high kinetic energy	How low kinetic energy
Consumes more fuel	Consumes less fuel
Causes more damage during collision	Causes less damage during collision

» As an object's mass increases its kinetic energy increases (direct relationship).

كلما زادت كتلة الجسم زادت طاقة حركته (العلاقة طردية).



Effect of Mass on Collision
تأثير الكتلة على التصادم

If a bike moving with a speed of 50 km/hr hits a person,

عندما تصطدم دراجة تتحرك بسرعة ٥٠ كم في الساعة بشخص؛



the person may get injured only and he/she will survive.

قد يصاب الشخص فقط وينجو من الموت.

If a car moving with a speed of 50 km/hr hits a person,

عندما تصطدم سيارة تتحرك بسرعة ٥٠ كم في الساعة بشخص؛



the person's life may be in danger.

تتعرض حياة الشخص لخطر شديد.





1 Choose the correct answer:

1. By increasing the force acting on the cart, its kinetic energy ....
   a. becomes zero
   b. remains constant
   c. increases
   d. decreases
2. All the following affect the kinetic energy of an object, except the ....
   a. object's mass
   b. object's speed
   c. object's color
   d. force acting on the object
3. As an object covers the same distance in longer time, its kinetic energy ....
   a. becomes zero
   b. remains constant
   c. increases
   d. decreases
4. The shape of the clay ball changes slightly when the ball ....
   a. is thrown strongly
   b. is thrown lightly
   c. falls from your hand
   d. falls from the top of a building
5. The car with a speed of .... kilometers per hour consumes the least amount of fuel.
   a. zero
   b. 50
   c. 100
   d. 150
6. Which object has the smallest engine?
   a. A static car
   b. A moving truck
   c. A moving bike
   d. A static train
7. Which object consumes less amount of fuel?
   a. A moving bike
   b. A moving car
   c. A moving truck
   d. A static car
8. The kinetic energy of a moving car decreases when ....
   a. the car is sliding on a ramp
   b. the fuel runs out
   c. the driver applies brakes to decrease the car's speed
   d. the driver presses the gas pedal to increase the car's speed
9. There is a .... relation between an object's speed and its kinetic energy.
   a. no
   b. direct
   c. indirect
   d. inverse

10. When a fast car hits a woman in the street, ...
a. she will survive
b. she will be injured
c. her life is in danger
d. nothing happens to her

2 Put (✓) or (✗):

1. As the mass of an object increases, its kinetic energy decreases. ( )
2. A heavy moving object has higher kinetic energy than a light moving object. ( )
3. When a moving bike hits a man, he may be injured only and survive. ( )
4. A static truck has a bigger engine than a moving car. ( )
5. A static truck consumes more fuel than a moving car. ( )
6. A moving bike's engine is smaller than the car's engine. ( )
7. The relationship between the speed of an object and its kinetic energy is a direct relationship. ( )
8. As the force acting on a moving body increases, its speed decreases. ( )

3 Complete the following sentences:

1. By increasing the .... acting on an object, its kinetic energy increases.
2. As an object moves ...., its kinetic energy decreases.
3. A static truck has a bigger .... than a moving car.
4. .... energy is affected by the object's speed.
5. A moving car consumes .... fuel than a moving truck.
6. A moving truck causes more .... than a moving car.
7. If the clay ball is thrown strongly, the shape of the ball ....
8. The shape of the clay ball when it's thrown .... has less damage than when it's thrown ....

4 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 If the clay ball falls	a. the shape of the ball changes much more.
2 If the clay ball is thrown strongly	b. the shape of the ball changes more.
3 If the clay ball is thrown lightly	c. the shape of the ball doesn't change.
	d. the shape of the ball changes slightly.

1 .... 2 .... 3 ....

5 Study the following figures, then answer the questions:

A moving bike	A static truck	A moving car
Figure (1)	Figure (2)	Figure (3)

a. Figure (......) has no kinetic energy.

b. Figure (......) has no engine.

c. Figure (......) consumes fuel.

d. The engine in figure (......) is smaller than the engine in figure (......).

e. The kinetic energy in figure (......) is more than that in figure (......).

6 Give reasons for:

1 A moving truck consumes more fuel than a moving car.

....

2 The engine of the truck is bigger than the engine of the car.

....

7 What happens if:

1 The force acting on a moving object increases. (Concerning its kinetic energy) ....

2 An object moves faster. (Concerning its kinetic energy)

....

3 A fast-moving bike hits a person. ....

4 A fast-moving car hits a person. ....

Lesson 4

Activity 10 Mass in Collisions

Activity
1. How Does Mass Affect Speed?

Tools:

3 toy cars (with different masses) – 2 books – a scale – cardboard (for the ramp) – stopwatch – ruler - tape

Steps:

1. Adjust the cardboard as a ramp, as shown in the figure.
2. Mark a finish line on the ground at a distance of one meter from the ramp using a tape.
3. Weigh car (A) using the scale and record its mass in the table.
4. Repeat the previous steps on car (B) and car (C).
5. Calculate the speed of the three cars.

Results:

Car	Mass (gm)	Distance (meter)	Time (second)	Speed (m/s)
(A)	100	1	5	$\frac{1}{5}$
(B)	150	1	4	$\frac{1}{4}$
(C)	200	1	2	$\frac{1}{2}$

Conclusion:

» By increasing the mass of the car on the ramp, the object's speed on the ramp increases.



Activity

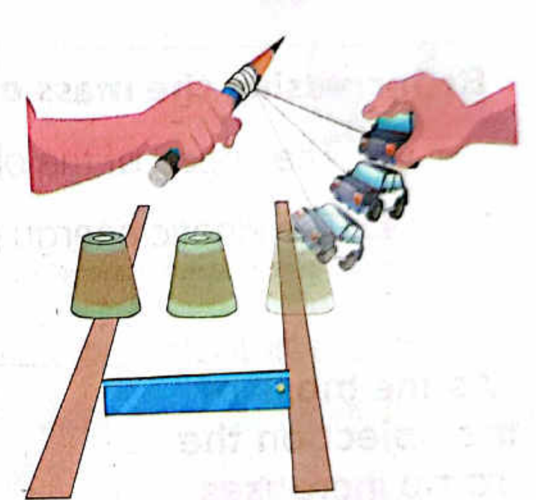
2. How Does the Mass Affect Kinetic Energy?

Tools:

3 toy cars (with different masses) - pencil - ruler - tape - paper cup

Steps:

1. Tie one end of the string to a pencil and the other end to the toy car.
2. Place the paper cup on the floor and mark its location on the floor using a piece of tape.
3. Release the toy car to collide with the paper cup.
4. Mark the distance where the cup moved by using the ruler.
5. Repeat the previous steps by using cars (B) and (C).

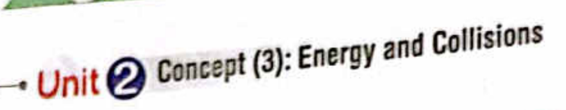


Observation:

Car	(A)	(B)	(C)
Distance	8 cm	10 cm	12 cm

Conclusion:

- By increasing the mass of an object, its kinetic energy increases.
- If the two objects have the same mass, the faster object has the higher energy.



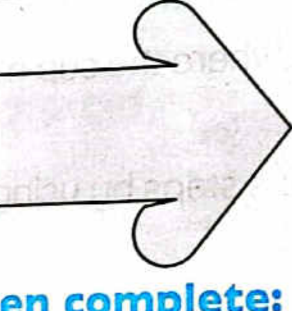
Relationship Between an Object's Speed and Its Mass on a Ramp

Truck (biggest mass)	**Car (smallest mass)**
» It will cover a long distance. 	» It will cover a short distance. 

By increasing the mass of an object on the ramp,

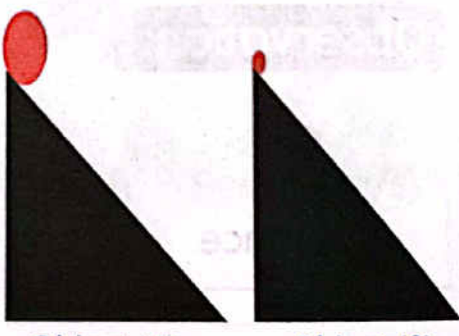
- » The speed of the object increases.
- » The kinetic energy of the object increases.

As the mass of the object on the ramp increases



Kinetic energy increases

Study the following figures, then complete:



1. Object (..........) reaches the ground faster than object (..........).
2. Object (2) covers a .... distance than object (1).
3. Object (..........) covers a longer distance.
4. The kinetic energy of object (..........) is greater than that of object (..........).



1 Choose the correct answer:

1. The speed of the bike .... when it slides down an inclined road.
   a. increases
   b. decreases
   c. remains constant
   d. becomes zero

2. From the opposite figures, which statement is correct?
   a. Ball (1) and ball (2) reach the ground together.
   b. Ball (1) reaches the ground slower than ball (2).
   c. Ball (2) reaches the ground faster than ball (1).
   d. Ball (2) reaches the ground slower than ball (1).

   (1) (2)

3. All the following factors affect the speed of the object on the ramp, except ....
   a. the object's mass
   b. the height of the ramp
   c. the color of the ramp
   d. the angle of the inclined ramp

4. Which ball reaches the ground first?
   a.
   b.
   c.
   d.

5. The moving heavy ball becomes faster on the ....
   a. flat road
   b. curved road
   c. straight road
   d. inclined ramp

6. Adam wins due to the ramp's ....
   a. mass
   b. type
   c. height

2 Put (✓) or (✗):

1. A small object slides on the ramp faster than a big object. ( )
2. By increasing the angle of the inclined ramp, the kinetic energy decreases. ( )
3. The object that takes the longest time on the ramp has the biggest mass. ( )

4. As the height of the ramp increases, the object moves faster on the ramp. (   )

3 Complete the following sentences:

1. By .... the angle of the inclined ramp, the speed of the object decreases and its kinetic energy ....
2. A truck is .... than a car on the inclined ramp.
3. A light object moves .... than a heavy object on the inclined ramp.
4. A fast object has .... kinetic energy than a slow object.

4 Study the following figures, then complete:

Figure (A) Figure (B) Figure (C)

1. The ball in figure (C) is faster than the ball in figure (.......).
2. The ball in figure (C) is slower than the ball in figure (.......).

5 Give reasons for:

1. A big truck reaches the ground faster than a small car when it moves on a ramp.

....

2. The height of the ramp affects the object's speed on it.

....

6 What happens if:

1. You increase the height (angle) of the inclined ramp. (Concerning speed).

....

2. An object goes from a flat road to an inclined road. (Concerning speed)

....



Activity 11 Energy Conservation During Collision

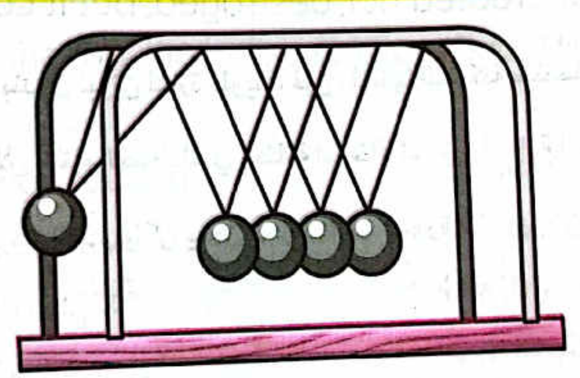


When you play a game with marbles
عندما تلعب بكرات البلي الصغيرة

- Kinetic energy is transferred from your hand to the 1st marble, then to the 2nd one and so on.
- Some kinetic energy is changed into sound energy, so we hear a click sound during the collision.

- تنتقل الطاقة الحركية من يدك إلى كرة البلي الأولى ثم إلى الثانية وهكذا.
- تتحول بعض الطاقة الحركية إلى طاقة صوتية لذلك نسمع صوت طقطقة أثناء الاصطدام.

Energy Transformation in Newton's Cradle
تحولات الطاقة في بندول نيوتن



1 When the ball is raised up - عند رفع البندول لأعلى

- The ball stores potential energy and doesn't contain any kinetic energy.

تختزن الكرة طاقة الوضع ولا تمتلك أي طاقة حركة.

2 When you let go of the ball - عند ترك الكرة لتتحرك

- Potential energy decreases gradually and is converted into kinetic energy.

تقل طاقة الوضع تدريجيًا وتتحول لطاقة حركة.

3 When the ball hits the 1st ball next to it - عندما تصطدم الكرة بأول الكرات

- Kinetic energy transfers to the 1st ball, then to the rest of the other balls.
  تنتقل الطاقة الحركية للكرة الأولى ومن ثم لبقية الكرات.
- Some kinetic energy is changed to sound energy during collision.
  تتحول بعض الطاقة الحركية لطاقة صوتية أثناء التصادم.
- Some kinetic energy is changed to thermal energy due to the friction between the strings and the other parts during collision.
  تتحول بعض الطاقة الحركية لطاقة حرارية بسبب الاحتكاك بين الخيط والأجزاء الأخرى أثناء التصادم.



1. If you leave the moving balls of Newton's cradle long enough, their kinetic energy will decrease gradually until they stop.
2. Energy is conserved and no energy disappears because during collision the energy in equals the energy out.
3. Energy is neither created nor destroyed, but it can be changed.

1. إذا تركت الكرات المتحركة في بندول نيوتن لفترة طويلة، فإن طاقتها الحركية ستنخفض تدريجيًا حتى تتوقف.
2. يتم حفظ الطاقة ولا تختفي لأن أثناء الاصطدام في الطاقة الداخلة تساوي الطاقة الخارجة.
3. الطاقة لا تفنى و لا تستحدث من العدم ولكن يمكن تحويلها من صورة لأخرى.

Activities 12, 13 & 14





1 Choose the correct answer:

1. All these forms of energy exist in Newton's cradle, except .... energy.
   a. potential b. kinetic c. chemical d. sound
2. The potential energy is converted gradually to kinetic energy when ....
   a. the ball is raised up
   b. you leave the ball to fall
   c. the ball hits the first other ball
   d. the last ball moves
3. When the ball of Newton's cradle hits the first of the other balls so the last ball will move, this is due to kinetic energy transferring to ....
   a. the first ball only
   b. the second ball only
   c. the last ball only
   d. all the balls
4. In Newton's cradle, when the ball moves toward the other balls, the potential energy ....
   a. equals zero
   b. increases
   c. decreases
   d. remains constant
5. If you leave the moving balls of Newton's cradle long enough, kinetic energy will ....
   a. increase gradually
   b. decrease gradually
   c. remain constant
   d. decrease quickly
6. .... energy is stored inside the ball of Newton's cradle before leaving it.
   a. Chemical b. Sound c. Kinetic d. Potential

2 Put (✓) or (✗):

1. Potential energy becomes zero when you raise the ball up. (   )
2. Some kinetic energy is changed into sound energy, so we hear a click during collision. (   )
3. The ball doesn't contain any kinetic energy when it moves toward the other balls. (   )

4. If two balls in Newton's cradle hit the rest of the balls, one ball only will move from them. (   )
5. Some kinetic energy is changed to thermal energy due to the friction between the strings and the other parts during collision. (   )
6. Energy is conserved and no energy disappears. (   )

3 Complete the following sentences:

1. .... energy is stored in Newton's cradle balls when a ball is raised up.
2. When a ball moves toward the rest of the balls, ... energy is changed to .... energy.
3. When the ball is raised up, it stores .... energy and it doesn't have any .... energy.
4. Some kinetic energy is changed to .... energy during collision as we hear it, and also some kinetic energy is changed into .... energy due to the friction between the strings and the other parts during collision.
5. If you leave the moving balls of Newton's cradle long enough, their kinetic energy will .... until they ....
6. During collision, the energy in .... the energy out and no energy ....

4 Choose from column (A) what suits it in column (B):

Column (A) Newton's cradle cases:	Column (B) Energy changes
1. When the ball is raised up	a. potential energy changes to kinetic energy.
2. When the ball moves toward the rest of the balls	b. kinetic energy changes to potential energy.
3. When the ball hits the 1st ball	c. kinetic energy transfers to the 1st ball only.
	d. kinetic energy transfers to the rest of the balls.
	e. the ball stores potential energy only.

1. ....
2. ....
3.

5 Arrange the following steps in Newton's cradle:

1. (......) The ball moves toward the other balls.
2. (......) Kinetic energy transfers to all of the other balls.
3. (......) The ball is raised up, so it stores potential energy.
4. (......) The Last ball moves.
5. (......) The ball hits the first ball.
6. (......) Some kinetic energy changes to sound and heat energies.

6 Give reasons for:

1. There are many kinds of energy transformations taking place during the collision of balls in Newton's cradle.

   ....

2. During collision, the energy in equals the energy out.

   ....

7 What happens if:

1. You raise the ball of Newton's cradle up without leaving it.

   ....

   ....

2. You leave the ball of Newton's cradle to move toward the other balls.

   ....

   ....

3. The ball of Newton's cradle hits the first of the other balls.

   ....

   ....

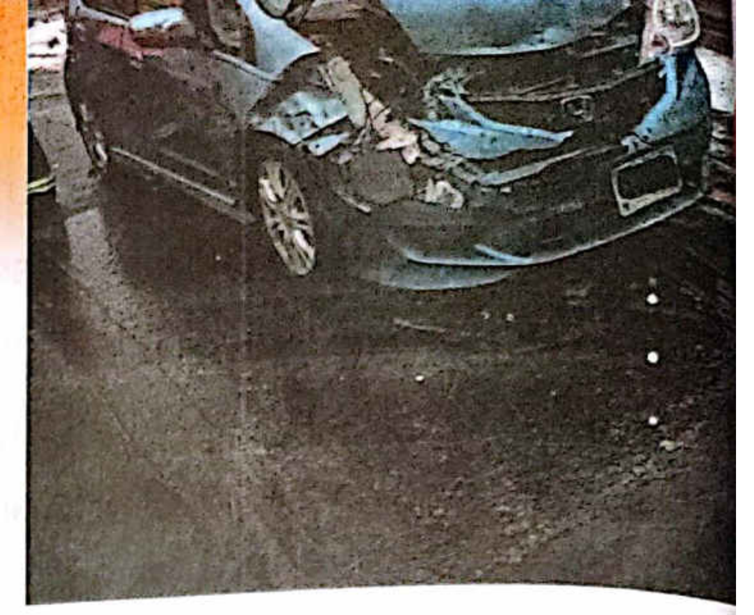
4. You leave the moving balls of Newton's cradle long enough.

   ....

   ....

Project

VEHICLE SAFETY



- Modern vehicles are designed with a lot of safety features, such as seatbelts and airbags to keep the driver and passengers safe.

- Sometimes a seatbelt is not enough during collision, so the airbag is added to absorb the energy of the car during collision.

- Airbags are made of nylon material folded inside the steering wheel, seats, dashboard or doors.

- During collision, sensors tell the airbag to inflate fast with the gas to provide a soft cushion for the driver or passengers.

Unit 1 - Concept 1 - Lesson 1

English	Arabic	English	Arabic	English	Arabic
Adapt	يتكيف	Bare feet	حافي القدمين	Prey	الفريسة
Predator	المفترس	Toes	أصابع	Predators	الحيوانات المفترسة
Fats	دهون	Weave around	تلتف حول	Camouflage	التخفي
Hump	السنام	Polar bear	الدب القطبي	Antarctica	القارة القطبية
Environment	البيئة	Arctic region	القطب الشمالي	Dense fur	فراء كثيفة
Adaptation	تكيف	Brown bear	الدب البني	Reproduce	يتكاثر
Desert lizard	سحلية الصحراء	Caracal	كاراكال	Penguin	البطريق
Shaded areas	أماكن الظل	Fennec fox	ثعلب الفنك	Sneak up	التسلل
Blood vessels	أوعية دموية	Scales	حراشيف	Survive	ينجو
Fur	فراء				

Unit 1 - Concept 1 - Lesson 2

English	Arabic	English	Arabic	English	Arabic
Structural adaptation	تكيف تركيبي	Arctic fox	الثعلب القطبي	Competition	منافسة
Behavioral adaptation	تكيف سلوكي	Bull shark	قرش الثور	Ocean	محيط
Migration	الهجرة	Countershading	التباين اللوني	Shadow	ظل
Habitat	الموطن	Salty water	المياه المالحة	Panther chameleon	حرباء النمر
Lose	يفقد	Tear up	يمزق	Scare	تخيف
Strength	قوة	Flesh	لحم	Sticky	لزج
Sense of hearing	حاسة السمع	Hunt time	وقت الصيد	Tongue	لسان
Hunting	الصيد	Sharp	حادة	Tail	ذيل
Pants	يلهث	Predict	تتوقع	Tropical rainforests	الغابات الاستوائية الممطرة
Burrows	جحور				

Unit 1 - Concept 1 - Lesson 3

English	Arabic	English	Arabic	English	Arabic
Acacia trees	أشجار السنط	Leaves	الأوراق	Wetland	مستنقعات
Kapok trees	أشجار الكابوك	Taproot	الجذر الوتدي	Desert	صحراء
Savannah forests	غابات السافانا	Deep soil	أعماق التربة	Forest	غابة
Amazon rainforests	غابات الأمازون	Poison	سمّ	Float	تطفو
Grassland	موطن عشبي	Giraffe	الزرافة	Resist	تقاوم
Lack	نقص	Spines = Needles	أشواك	Triangular shape	شكل مثلثي
Soggy soil	تربة طينية	Delicious-smelling message	روائح مميزة	Cactus plant	نبات الصبار
Roots	الجذور	Buttress roots	الجذور الداعمة	Hand-shaped	شكل كف اليد
Trunk	الجذع				

Vocabulary

Unit 1 - Concept 1 - Lesson 4

Systems	أجهزة	Large intestine	الأمعاء الغليظة	Facilitates	تسهل
Organs	أعضاء	Get rid of	تتخلص من	Swallowing	بلع
Digestive system	الجهاز الهضمي	Nose	الأنف	Chest	الصدر
Respiratory system	الجهاز التنفسي	Trachea	القصبة الهوائية	Muscular tube	أنبوب عضلي
Functions	وظائف	Two lungs	الرئتان	Digestive juices	عصائر معدية
Breathing	تنفس	Diaphragm	الحجاب الحاجز	Secrete	يفرز
Nutrients	مواد غذائية	Exhalation	زفير	Respiration process	عملية التنفس
Mouth	الفم	Anus	فتحة الشرج	Smoking	التدخين
Throat (pharynx)	البلعوم	Digestion process	عملية الهضم	Bronchi	شعب هوائية
Esophagus	المريء	Teeth	الأسنان	Bronchioles	القصيبات
Liver	الكبد	Tongue	اللسان	Alveoli	الحويصلات الهوائية
Stomach	المعدة	Saliva	اللعاب	Contract	ينكمش
Pancreas	البنكرياس	Crushes	تكسير - تفتيت	Relax	يتمدد
Small intestine	الأمعاء الدقيقة	Chewing	المضغ	Inhalation	شهيق

Unit 1 - Concept 1 - Lesson 5

Gills	خياشيم	Human activities	أنشطة الإنسان	Cars exhausts	عوادم السيارات
Lungs	الرئتان	Severe weather conditions	ظروف مناخية قاسية	Soil pollution	تلوث التربة
Inhale	يستنشق	Wildfires	حرائق الغابات	Ecosystem	بيئة
Exhale	يخرج	Floods	الفيضانات	Asthma	الربو
Blood vessels	أوعية دموية	Cutting down forests	قطع أشجار الغابات	Heart problems	أزمات قلبية
Natural changes	تغيرات طبيعية	Plowing grassland	تجريف التربة	Replanting	إعادة زراعة

Unit 1 - Concept 1 - Lesson 6

Amphibians	برمائيات	Water ponds	مياه البرك	Species	فصائل
Endangered species	الفصائل المهددة بالانقراض	Skin	جلد	Golden frog	الضفدع الذهبي
Frogs = Toads	ضفادع	Sensitive	حساسة	Extinction	الانقراض
Salamander	سلمندر	Extinct	تنقرض	Throwing wastes	إلقاء المخلفات
Water stream	مجرى المياه				

Unit 1 - Concept 2 - Lesson 1

Senses	الحواس	Dolphins	الدلافين	Sound waves	موجات الصوت
Communicate	تتواصل معًا	Deer	الغزالة	Owl	البومة
Egyptian mongoose	النمس المصري	Echo	صدى الصوت	Guarding	الحراسة
Chatter	الثرثرة	Reflection	انعكاس		

Unit 1 - Concept 2 - Lesson 2

Nocturnal animals	الحيوانات الليلية	Bowl-shaped face	وجه يشبه الوعاء	Distributed	يتفرع

Darkness	الظلام	Nervous system	الجهاز العصبي	Sensory organs	أعضاء حسية
Navigate	التنقل	Brain	المخ	Electrical impulses	نبضات كهربية
Snake	الثعبان	Spinal cord	النخاع الشوكي	Sensory receptors	مستقبلات حسية
Bats	الخفافيش	Nerves	الأعصاب	Response	رد فعل
Extraordinary	خارقة	Backbone	العمود الفقري		

Unit 1 - Concept 2 - Lesson 3

Spines	أشواك	Hind legs	أرجل خلفية	Translate	يترجم
Cactus plant	نبات الصبار	Reaction time	زمن الاستجابة	Jerboa	اليربوع
Withdraw	يبعد	Zigzag paths	مسارات متعرجة	Alerts	تأهب
Desert rodents	قوارض صحراوية	Respond	استجابة	Hopping legs	سيقان للقفز

Unit 1 - Concept 2 - Lesson 4

Visual response	استجابة بصرية	Pay attention	تنتبه	Muscles	عضلات
Auditory response	استجابة سمعية	Zigzag paths	مسارات متعرجة	Traffic sign	إشارة المرور
Blink	ترمش عينك	Signal	إشارة		

Unit 1 - Concept 2 - Lesson 5

Gathering information	جمع المعلومات	Translate	يترجم	Automatically	تلقائيًا
Sensory organs	الأعضاء الحسية	Reflex	رد الفعل	Reaction time	زمن الاستجابة

Unit 1 - Concept 3 - Lesson 1

Spectacular night vision	رؤية ليلية مذهلة	Night vision goggles	نظارات الرؤية الليلية	Torch	كشاف ضوئي
Tarsier monkey	قرد التارسير	Emit	يبث	Candle	شمعة
Fishing cat	القط السماك	Light	مصدر ضوء		

Unit 1 - Concept 3 - Lesson 2

Pupil	حدقة العين	Weakest light level	أقل مستوى للضوء	Focus	يركز
Sensitive	حساس				

Unit 1 - Concept 3 - Lesson 3

Visible form	صورة مرئية	Glow	تلمع	Bounce off	ترتد من
Tapetum lucidum	البساط الشفاف				

Unit 1 - Concept 3 - Lesson 4

Mirror	المرايا	Transparent materials	أجسام شفافة	Regular reflection	الانعكاس المنتظم
Metals	المعادن	Opaque materials	أجسام معتمة	Irregular reflection	الانعكاس غير المنتظم
Absorbed	الممتص	Lens	عدسة	Scatter	يشتت
Pass = Transmit	يمر	Shadow	الظل		

Vocabulary

Unit 1 - Concept 4 - Lesson 1

Fireflies	الخنافس المضيئة	Attract a mate	جذب رفيق	Warn off predators	تحذير من المفترسين
Chemical reaction	تفاعل كيميائي	Wings	أجنحة		

Unit 1 - Concept 4 - Lesson 2

Soft sound	صوت ناعم	Mating season	موسم التزاوج	Sailor	البحارة
Rough sound	صوت خشن	Feeding season	موسم الغذاء	Code	شفرة
High-pitched sound	درجة صوت حادة	Waving	يلوح بيده	Thump	الإبهام
Low-pitched sound	درجة صوت غليظة	Rescue flare	شعلة إنقاذ	Facial Expression	تعبير الوجه
Humpback whales	الحيتان الحدباء	Lighthouses	المنارات		

Unit 1 - Concept 4 - Lesson 3

Beeps	أصوات	Dashes	أشرطة	Distinct letters	حروف مميزة
Dots	نقاط				

Unit 1 - Concept 4 - Lesson 4

Honeybees	النحل	Specific location	مكان محدد	Specific role	دور معين
Hives	خلايا النحل	Soldier ants	جنود النمل	Nurse ants	عاملات النمل
Motion patterns	أنماط حركية	Smelly messages	روائح قوية	Scout ant	النمل الكشاف
Scout bee	نحلة كشافة	Ants	النمل	Communication system	أنظمة التواصل
Interpret	تفسر	Colonies	مستعمرات		

Unit 1 - Concept 4 - Lesson 5

High-pitched sounds	أصوات عالية التردد	Blind person	شخص كفيف	Nearby bodies	الأجسام القريبة
Cane	عكاز	Vibrations	الاهتزازات	Echo	صدى الصوت

Unit 2 - Concept 1 - Lesson 1

Static object	جسم ساكن	Pushing force	قوة الدفع	Rocket	صاروخ
Moving object	جسم متحرك	Pulling force	قوة السحب	Fixed	مثبت
Motion = Movement	الحركة	Bag	حقيبة	Engine	محرك
Force	القوة	Truck	شاحنة	Parachute	باراشوت (مظلة هبوط)
Speed	السرعة	Airplane	طائرة		

Unit 2 - Concept 1 - Lesson 2

Air/wind force	قوة الهواء	Distance	مسافة	Rope	حبل
Wind	رياح	Fixed point	نقطة ثابتة	Balanced force	قوة متوازنة
Leaves	أوراق شجر	Direction	اتجاه	Unbalanced force	قوة غير متوازنة
Engineers	مهندسون	Moving	تحريك	Gravity	الجاذبية
Fire extinguisher	طفاية حريق	Stopping	إيقاف	Starting point	نقطة الانطلاق
Cart	عربة تسوق	Tug-of-war game	لعبة شد الحبل	Toward	باتجاه

Unit 2 - Concept 1 - Lesson 3

Force	القوة	Holding object	رفع جسم	Rocket	صاروخ
Chair	كرسي	Friction force	قوة الاحتكاك	Satellite	قمر صناعي
Upward	لأعلى	Two touching surfaces	سطحان متلامسان	Lunching	إقلاع
Downward	لأسفل	Slow down	يبطئ		
Arm	ذراع	Stop	يوقف		

Unit 2 - Concept 1 - Lesson 4

Gently	برفق	Small toy car	سيارة لعبة صغيرة	Big truck	شاحنة كبيرة
Hard	بقوة				

Unit 2 - Concept 1 - Lesson 5

Energy	الطاقة	Ability	القدرة	Enable us	تمكننا
Work	الشغل				

Unit 2 - Concept 2 - Lesson 1

Sand surfer	المتزلج على الرمال	Roller coaster	لعبة قطار الملاهي	Kinetic energy	الطاقة الحركية
Sand dune	كثبان رملية	Motors	موتور السيارة	Potential energy	طاقة الوضع
Slope	منحدر	Gradually	تدريجيًا	Chemical energy	الطاقة الكيميائية
Rolls down	يتدحرج لأسفل	Battery	البطارية	Thermal energy	الطاقة الحرارية

Unit 2 - Concept 2 - Lesson 2

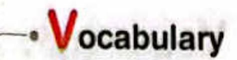
Cooking	الطبخ	Goal net	شبكة الهدف	Height	الارتفاع
Chocolate	شوكولاتة	Exerted force	القوة المبذولة	Speed	السرعة
Transfer	تنتقل	Enables	تمكنه		
Gain	تكتسب	Stored	المخزنة		

Unit 2 - Concept 2 - Lesson 3

Waves	أمواج	Transformed	تتحول	Flashlight	كشاف ضوئي
Vibration	اهتزاز	Motors	موتور السيارة	Gas oven	فرن الغاز
Boiling	الغليان	Energy used	الطاقة المستخدمة	Hand bell	جرس اليد
Spring	زنبرك - سوستة	Energy produced	الطاقة الناتجة	Electric bell	جرس كهربي

Unit 2 - Concept 3 - Lesson 1

Collision = Crashing	تصادم	Construction workers	عمال البناء	Folded	مطوية
Heavy objects	الأجسام الثقيلة	Cricket bat	مضرب الكريكيت	Steering wheel	عجلة القيادة
Light objects	الأجسام الخفيفة	Collide = Hit	يصدم أو يضرب	Inflate	تنتفخ
Truck	شاحنة	Cricket	لعبة الكريكيت	Deflate	تنكمش
Damage	دمار	Safety equipment	وسائل الأمان	Automatically	تلقائيًا
Wrecking ball	كرة الهدم	Airbag	الوسادة الهوائية	Absorb	تمتص
Swing	مُعلقة	Seatbelt	حزام الأمان		



Unit 2 - Concept 3 - Lesson 2

Collision = Crashing	تصادم	Distance covered	المسافة المقطوعة	Angle of the ramp	زاوية المنحدر
Traffic sign	إشارة المرور	Time taken	الزمن المستغرق	Height of the ramp	ارتفاع المنحدر
Transfer	تنتقل	Speed	السرعة	Severe	شديد
Speed	سرعة	Extra energy	طاقة زائدة	Repair	يصلح
Direction	اتجاه	Loud sound	صوت أعلى	Kinetic energy	طاقة الحركة
Injured	يصاب	Rubber ball	كرة مطاطية	Ramp = Slope = Inclined road	
Basics	أساسيات	Dangerous	خطير		منحدر مائل

Unit 2 - Concept 3 - Lesson 3

Clay	صلصال	Thrown strongly	رمي بقوة	Bike	دراجة
Fall	يسقط	In danger	معرض للخطر	Injured	يصاب
Thrown slightly	رمي برفق	Engine	محرك	Survive	ينجو

Unit 2 - Concept 3 - Lesson 4

Ramp = Slope	منحدر مائل	Inclined road	طريق مائل	Straight road	طريق مستقيم
Height	الارتفاع				

Unit 2 - Concept 3 - Lesson 5

Energy conservation	حفظ الطاقة	Store	تخزن	Create	يخلق
Marble ball	كرة البلي	Gradually	بالتدريج	Destroy	يدمر
Newton's cradle	بندول نيوتن	Friction	الاحتكاك	Disappear	تختفي
Raised up	ترفع لأعلى	Conserved	محفوظة		



2023

Final Revision

يصرف مجانا مع الكتا



Contents

1 Stories

1. Adaptation
2. Journey to the Desert
3. Adventure in the Ocean
4. Journey to the Forest
5. Digestive System
6. Nocturnal Animals
7. Pollution
8. Push and Pull

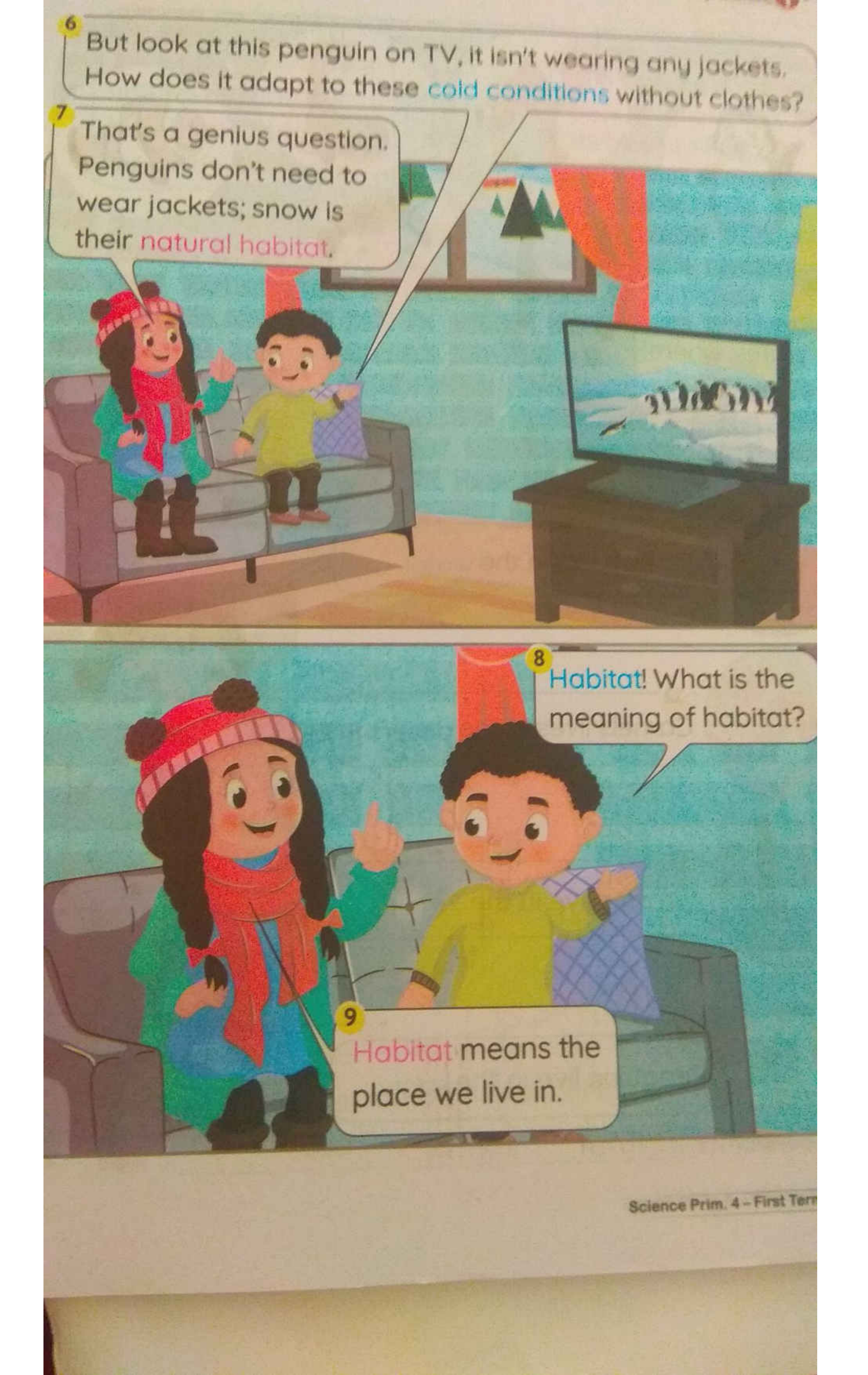
1 Adaptation



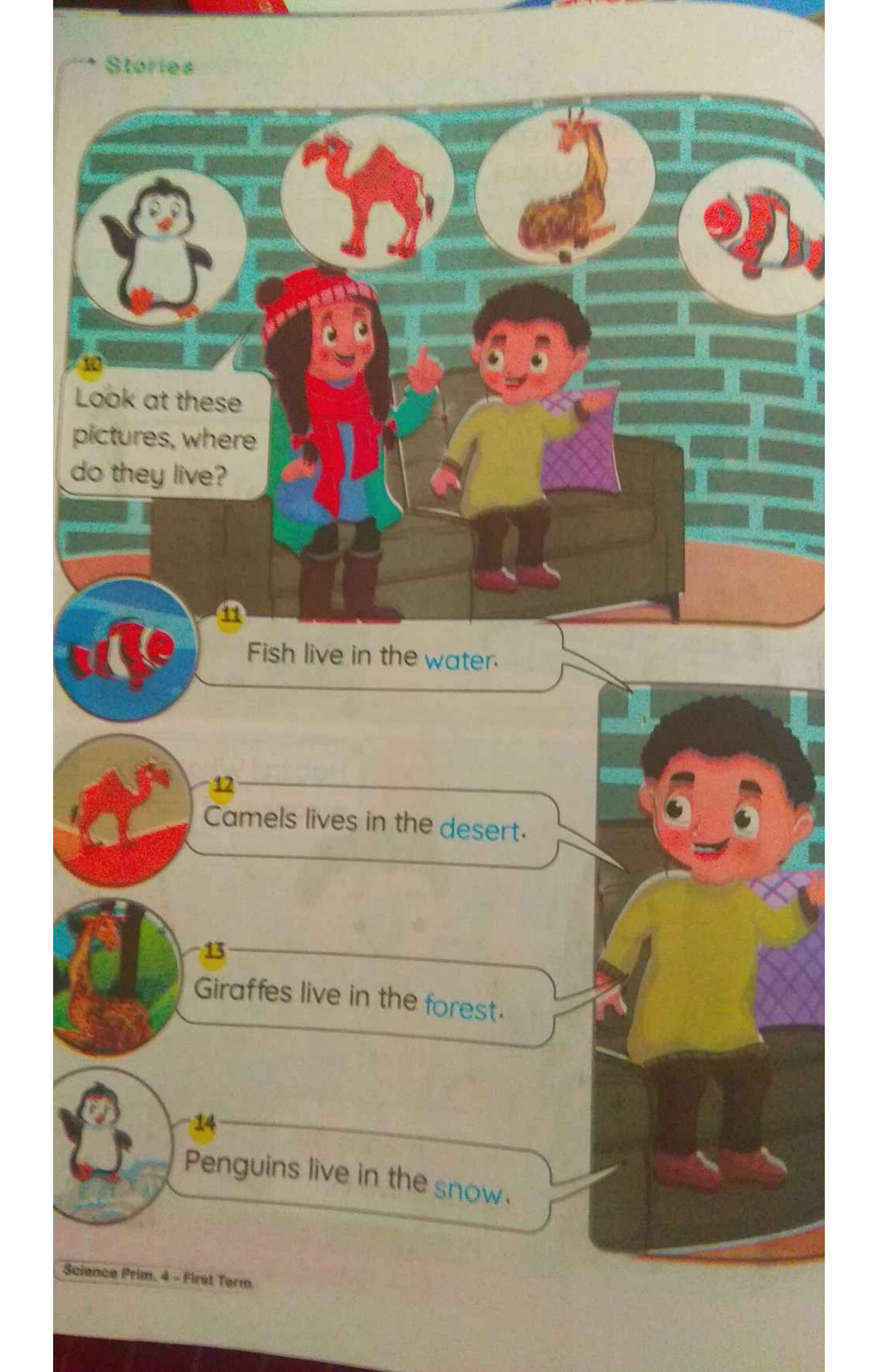
3 Adapt! What is the meaning of adapt?

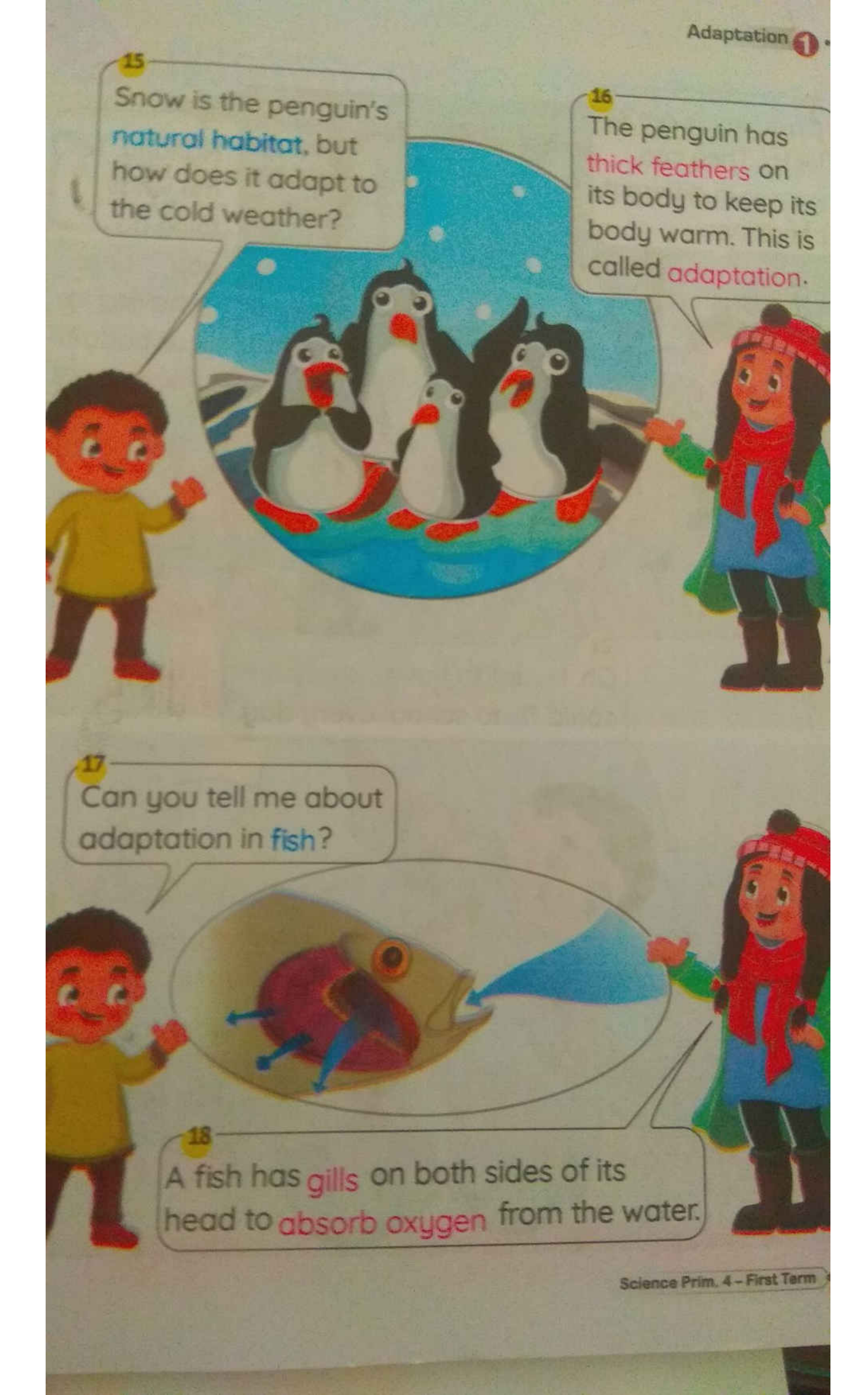
4 Adapt means we can change ourselves for new conditions.

5 It is very cold outside, so we need to adjust ourselves by wearing jackets.



6
But look at this penguin on TV, it isn't wearing any jackets. How does it adapt to these cold conditions without clothes?
7
That's a genius question. Penguins don't need to wear jackets; snow is their natural habitat.
8
Habitat! What is the meaning of habitat?
9
Habitat means the place we live in.


10
Look at these pictures, where do they live?
11
Fish live in the water.
12
Camels lives in the desert.
13
Giraffes live in the forest.
14
Penguins live in the snow.


15
Snow is the penguin's natural habitat, but how does it adapt to the cold weather?
16
The penguin has thick feathers on its body to keep its body warm. This is called adaptation.
17
Can you tell me about adaptation in fish?
18
A fish has gills on both sides of its head to absorb oxygen from the water.


19
Oh, animals are so lucky. They can survive in different conditions.
20
Hahaha. Tell me what thing do you dream of having in your body?
21
Oh, I want to have wings so I could fly to school every day.

2 Journey to the Deser

At night, Adam dreamed that he was on a trip in the desert with his sister Sara and the school scouting team.





2 I dreamed that we were on a desert trip.
was amazing. How can we go there?

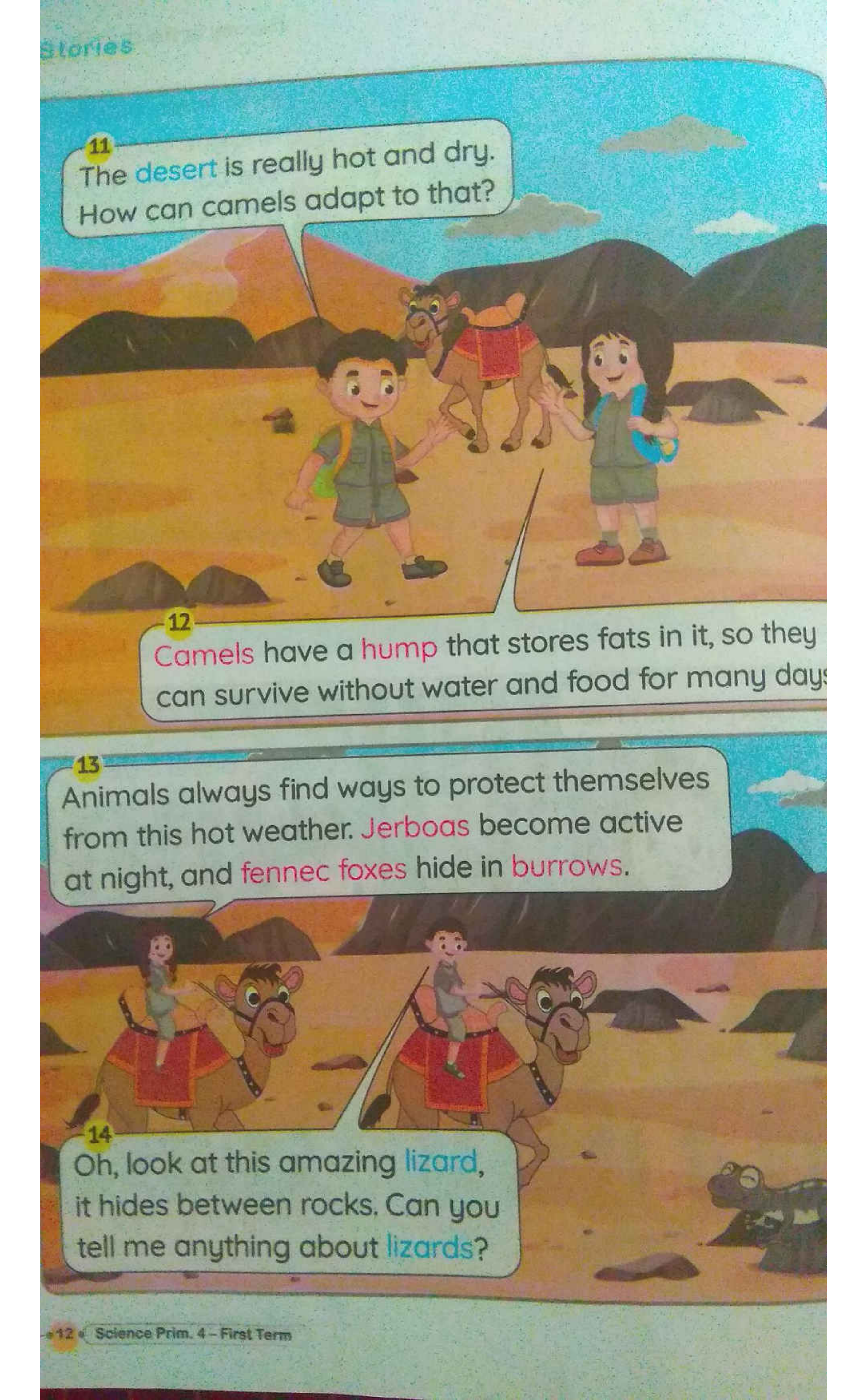
3 I can make you go anywhere,
but can you keep a secret?

4 Of course, yes.

5 I have a magic stick in my
closet that can do anything.

I am very excited. Can we
go to the desert now?


Journey to the Desert
Are you excited? We can visit many places like deserts or forests. We can also go diving underwater.
Oh, it will be a lot of fun. Lets go!
Say "desert" with me.
Desert, desert, desert.
Science Prim. 4 - First Term


11
The desert is really hot and dry. How can camels adapt to that?
12
Camels have a hump that stores fats in it, so they can survive without water and food for many days
13
Animals always find ways to protect themselves from this hot weather. Jerboas become active at night, and fennec foxes hide in burrows.
14
Oh, look at this amazing lizard, it hides between rocks. Can you tell me anything about lizards?


15
Lizards save their energy by finding shaded areas.
When prey comes close, they attack them.
16
Amazing lizard!
What about the fennec fox?
How can we find it?
17
It is very difficult to find a fennec fox here, because it lives in burrows to stay cool on sunny days.

19 The fennec fox adapted to eat different kinds of food, such as insects, fruits, plant roots and remnants of prey. As it is hard to find any food in the desert.

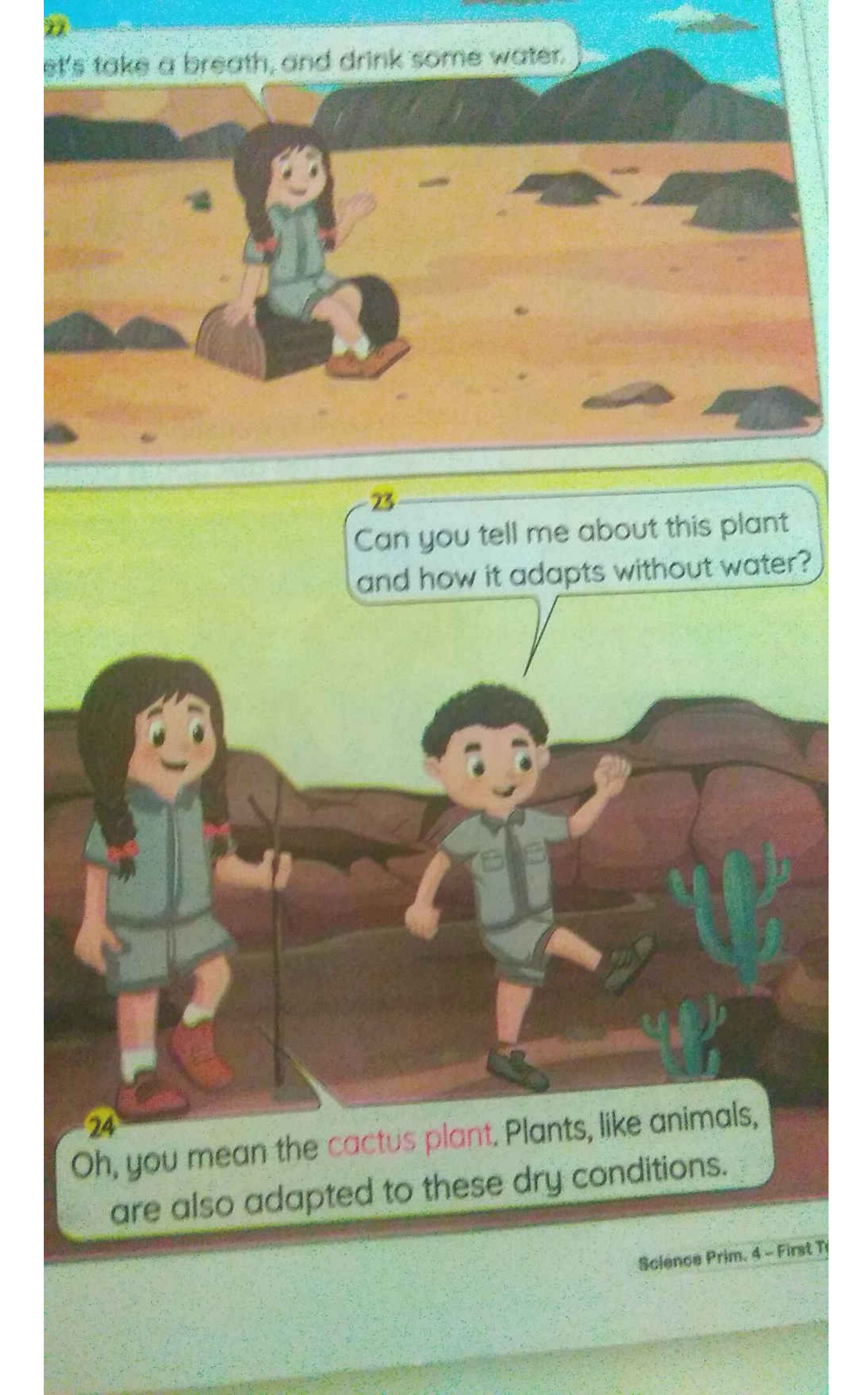


18 Animals in the desert are unlucky. I wonder how the fennec fox finds any food.

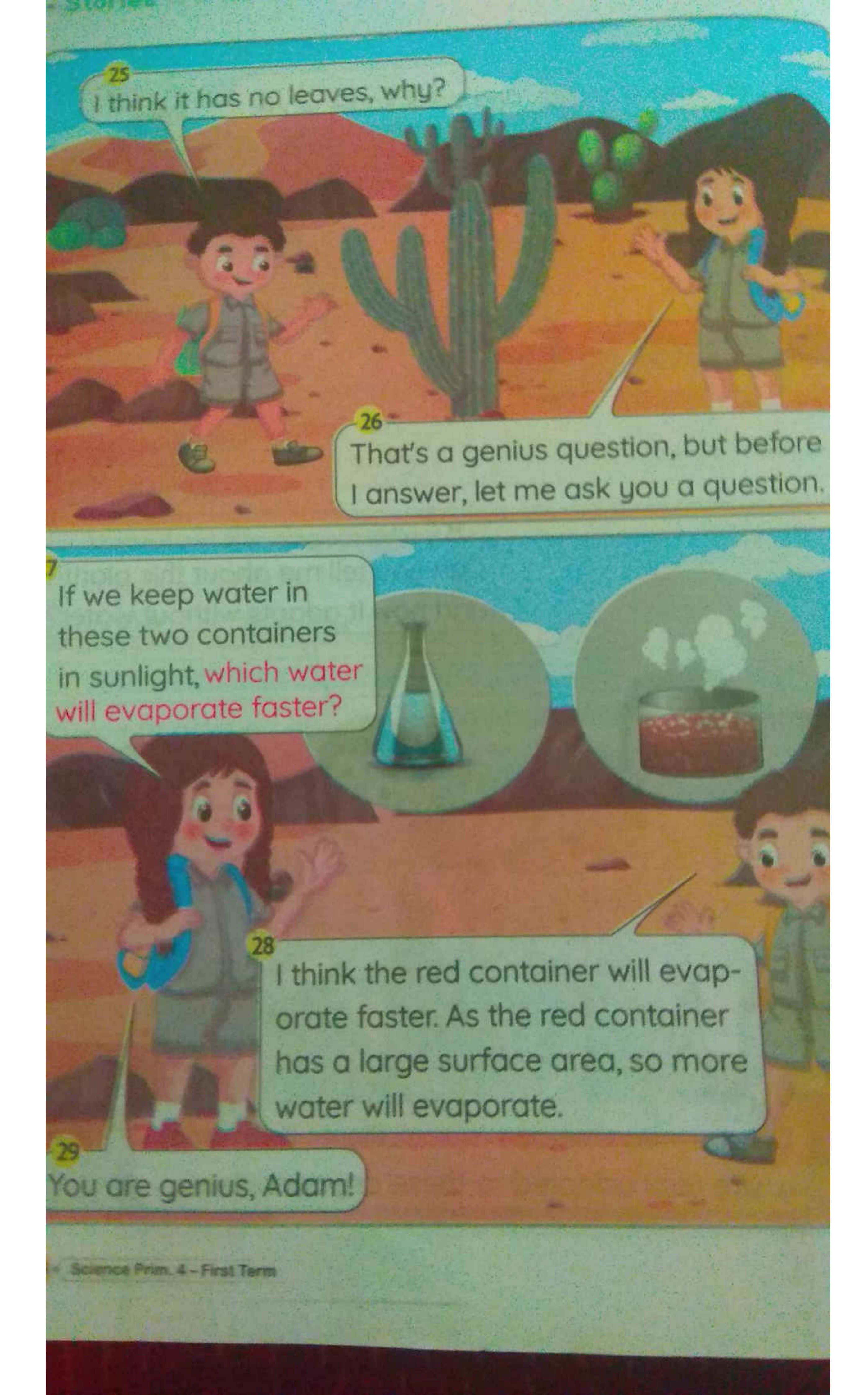
20 ...want to ask you about its extra-large ears?

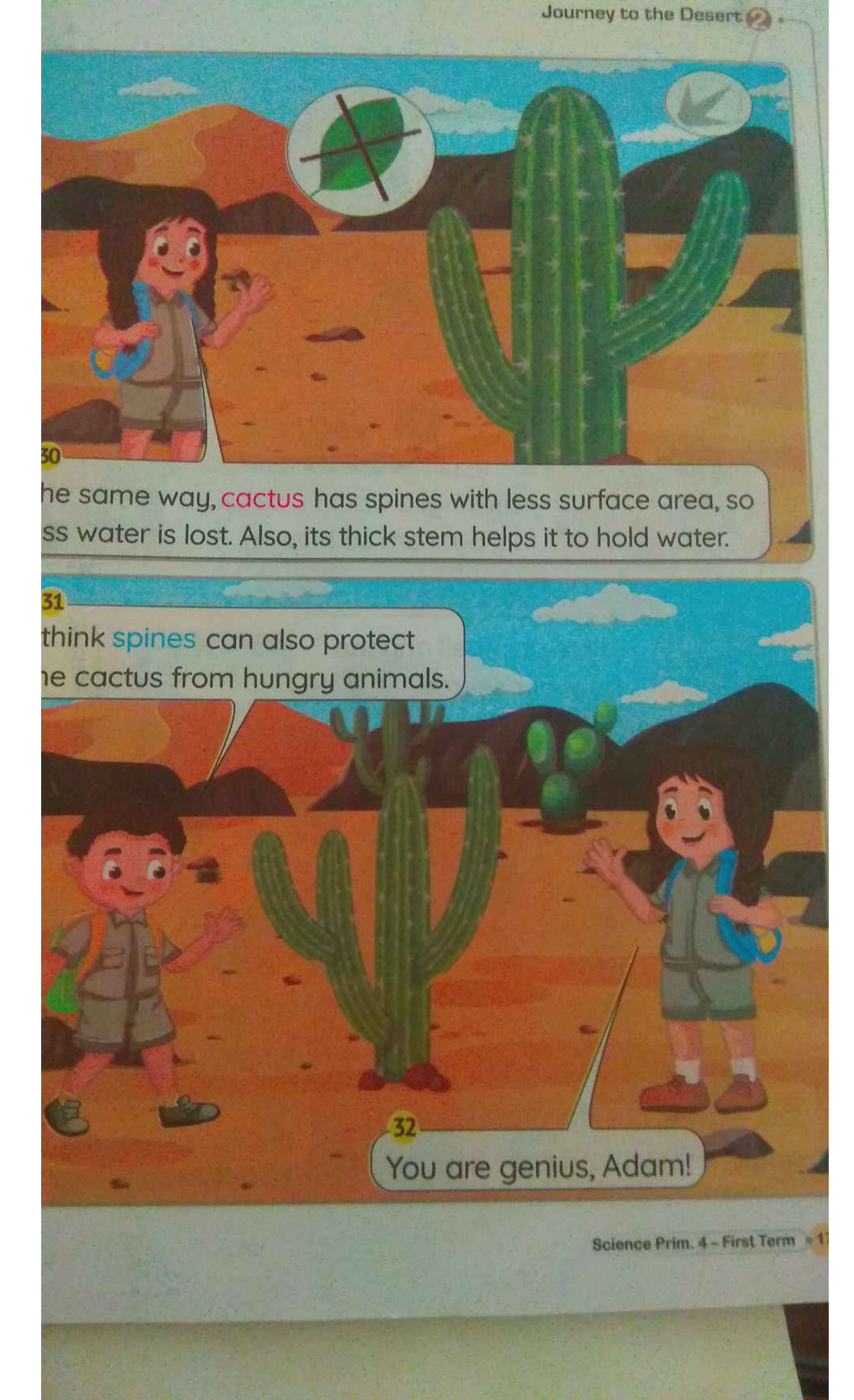


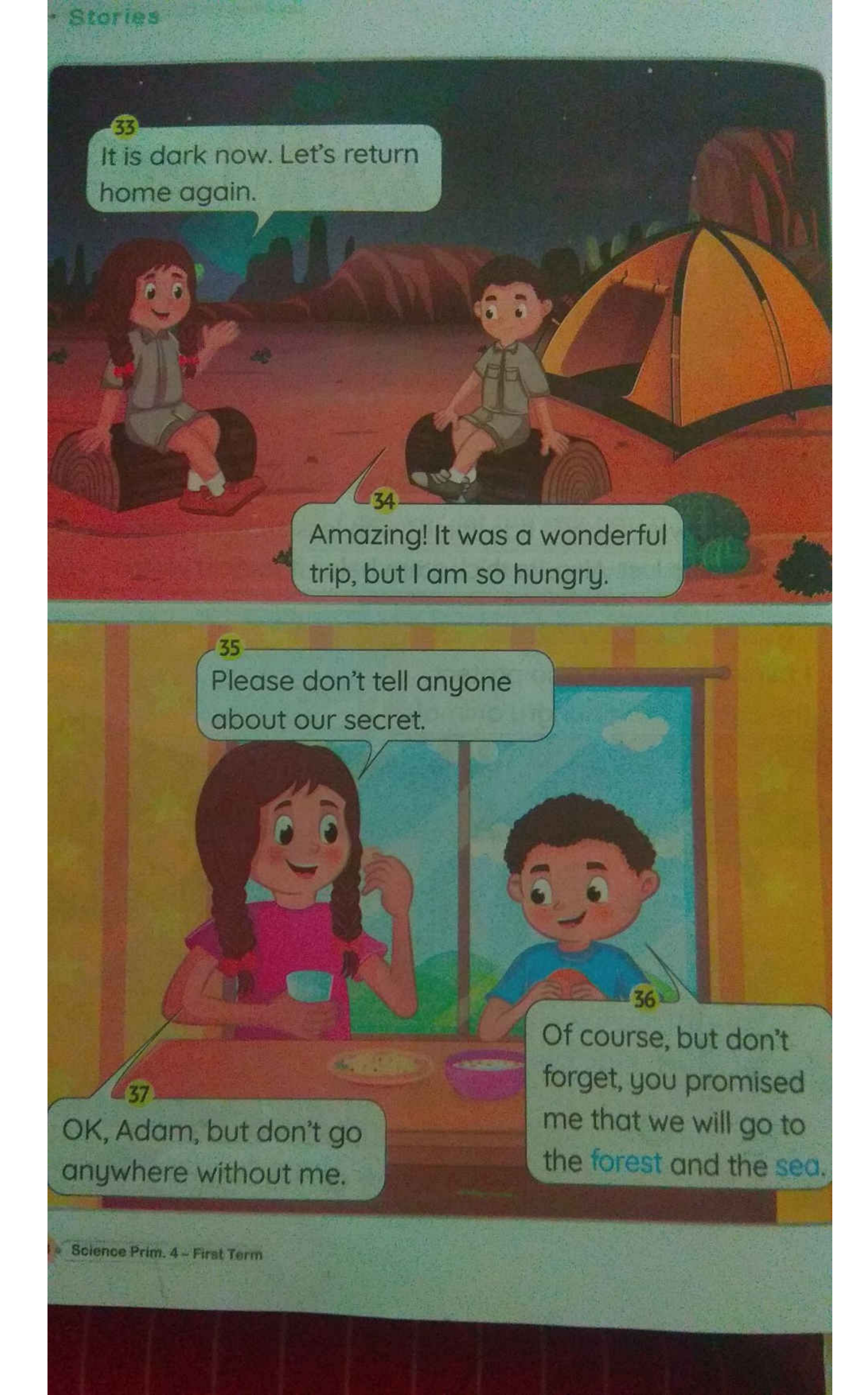
21 They helps it to lose heat and cool its body.



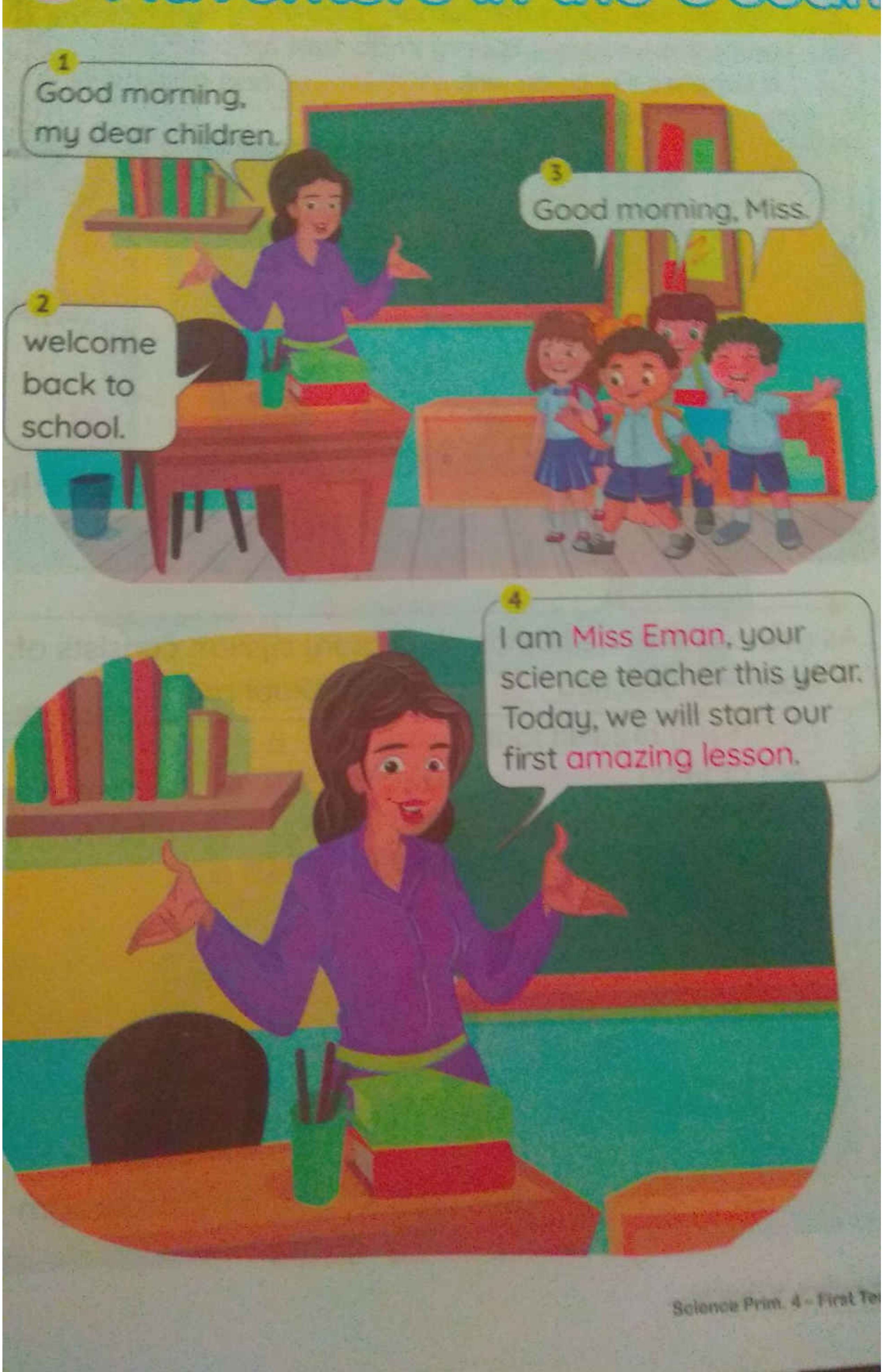
22
et's take a breath, and drink some water.
23
Can you tell me about this plant and how it adapts without water?
24
Oh, you mean the cactus plant. Plants, like animals, are also adapted to these dry conditions.

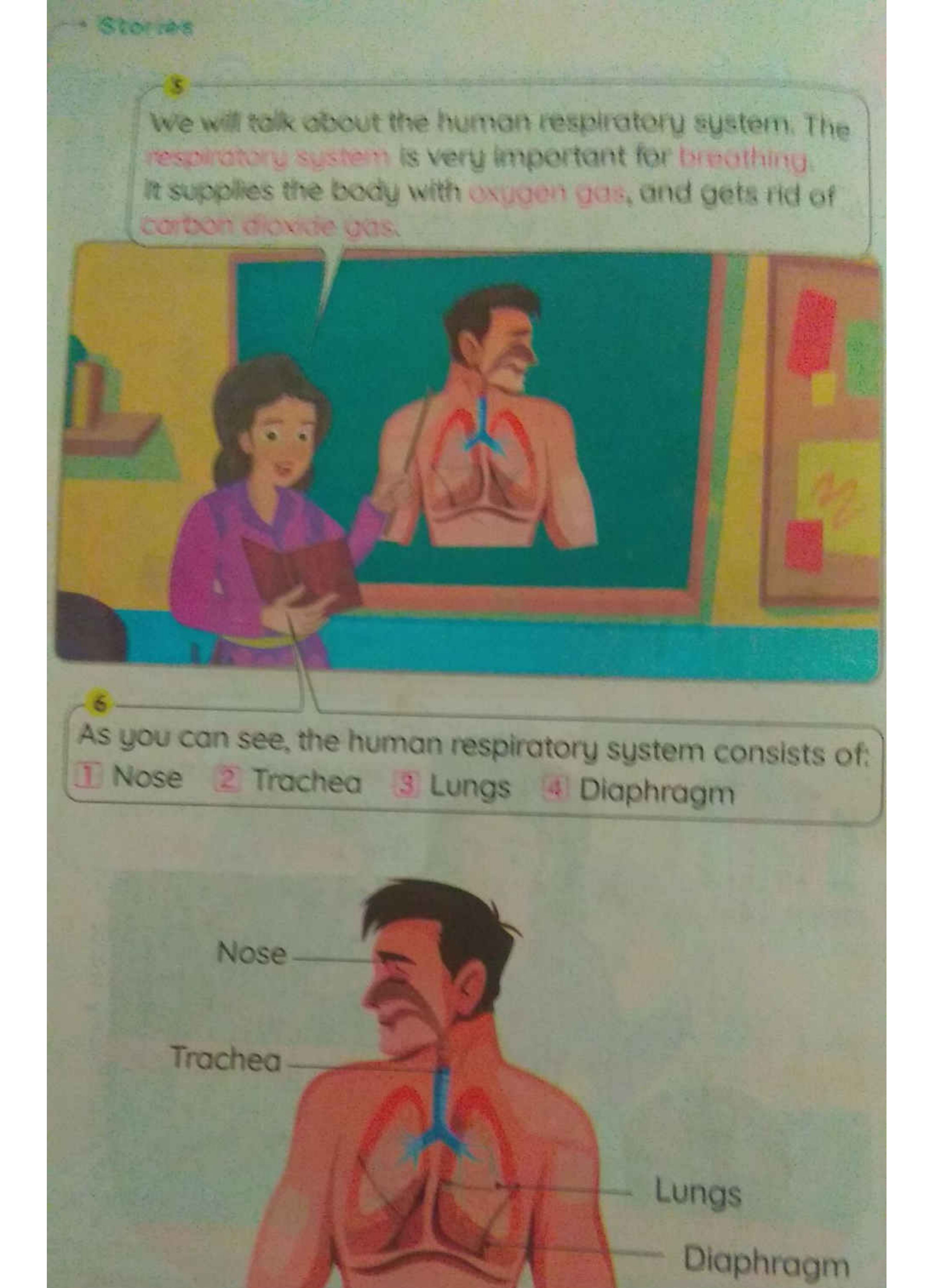

25
I think it has no leaves, why?
26
That's a genius question, but before I answer, let me ask you a question.
7
If we keep water in these two containers in sunlight, which water will evaporate faster?
28
I think the red container will evaporate faster. As the red container has a large surface area, so more water will evaporate.
29
You are genius, Adam!

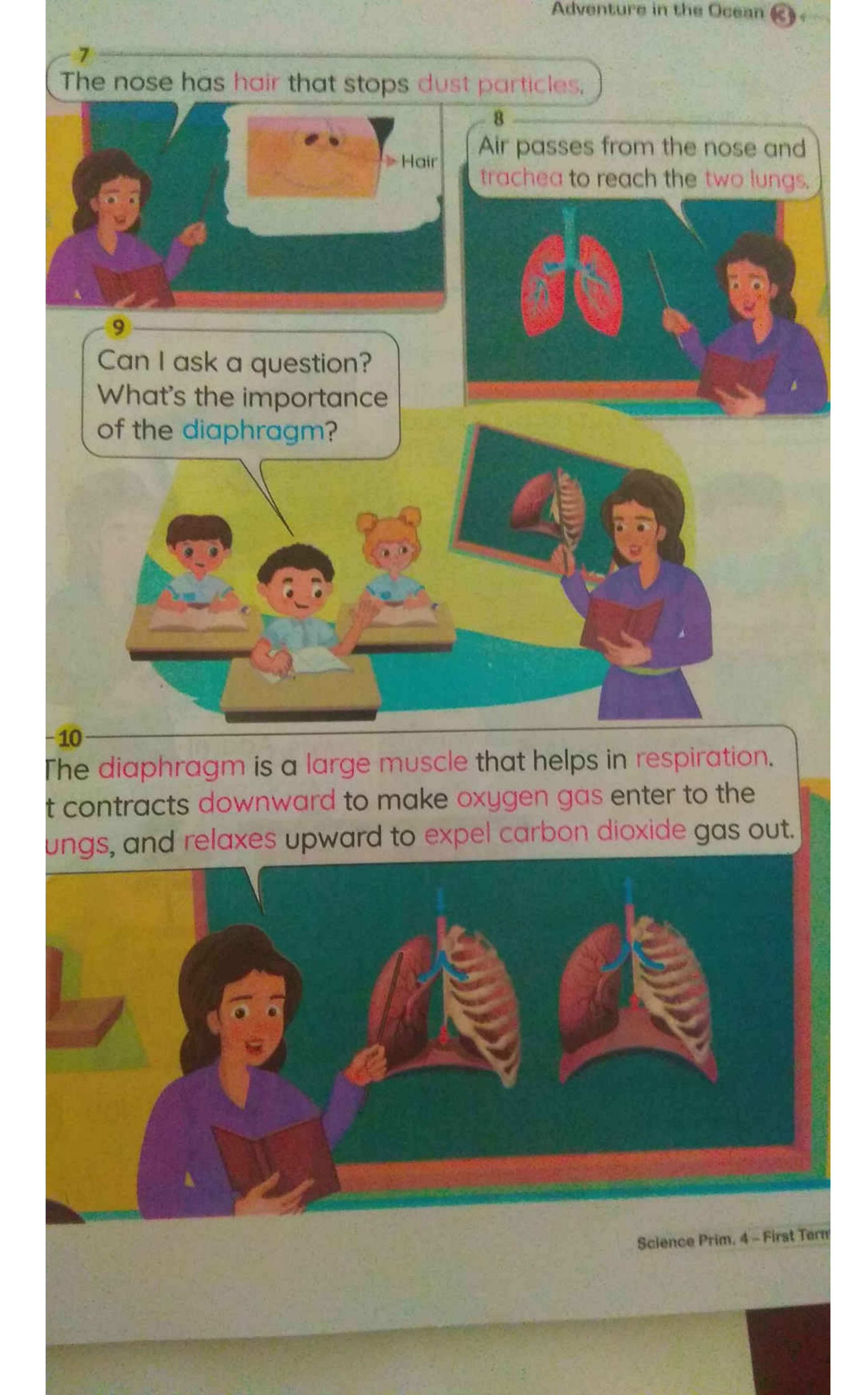

30
he same way, cactus has spines with less surface area, so
ss water is lost. Also, its thick stem helps it to hold water.
31
think spines can also protect
he cactus from hungry animals.
32
You are genius, Adam!


33
It is dark now. Let's return home again.
34
Amazing! It was a wonderful trip, but I am so hungry.
35
Please don't tell anyone about our secret.
36
Of course, but don't forget, you promised me that we will go to the forest and the sea.
37
OK, Adam, but don't go anywhere without me.

3 Adventure in the Ocean



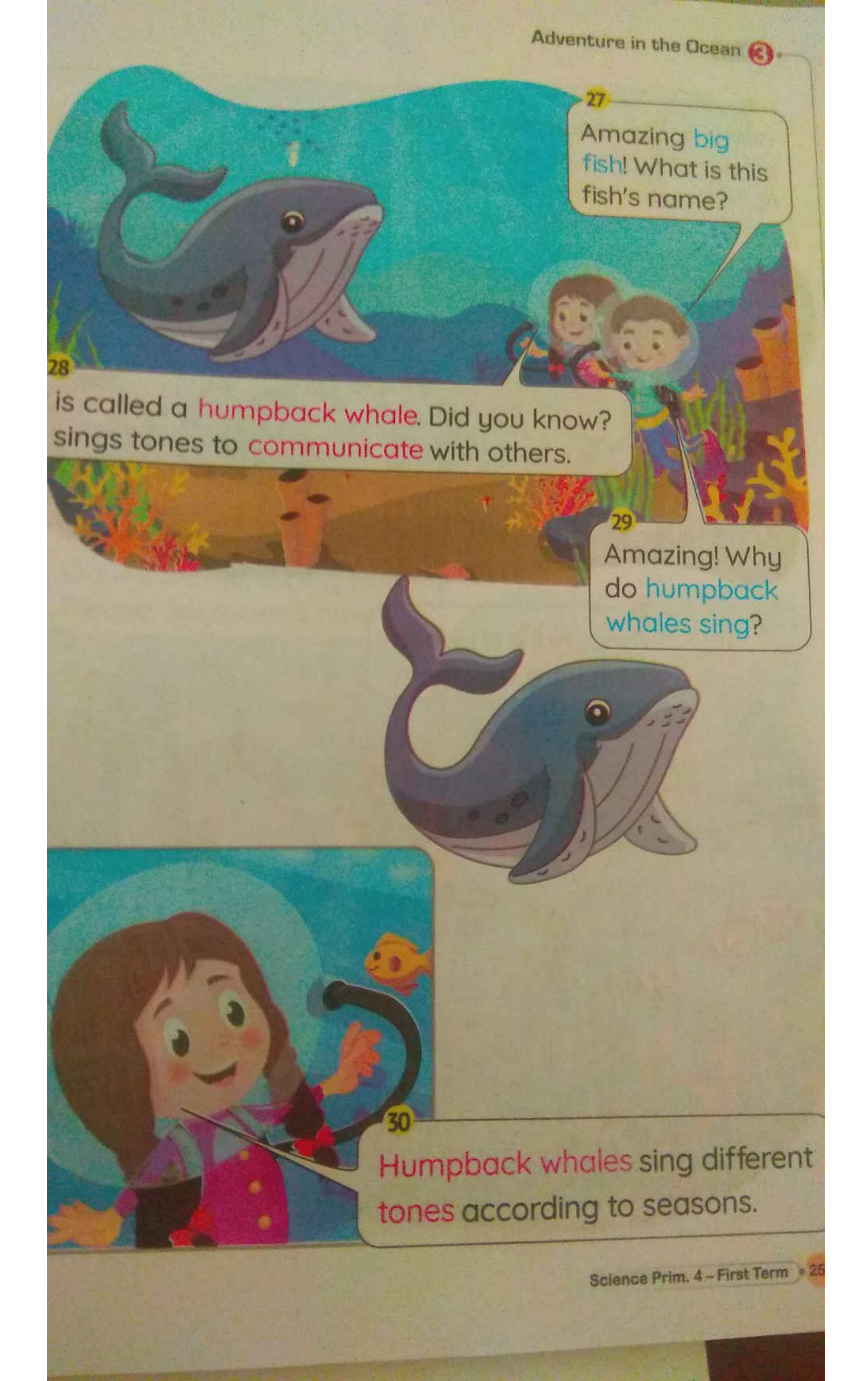

5
We will talk about the human respiratory system. The respiratory system is very important for breathing. It supplies the body with oxygen gas, and gets rid of carbon dioxide gas.
6
As you can see, the human respiratory system consists of:
1 Nose 2 Trachea 3 Lungs 4 Diaphragm
Nose
Trachea
Lungs
Diaphragm

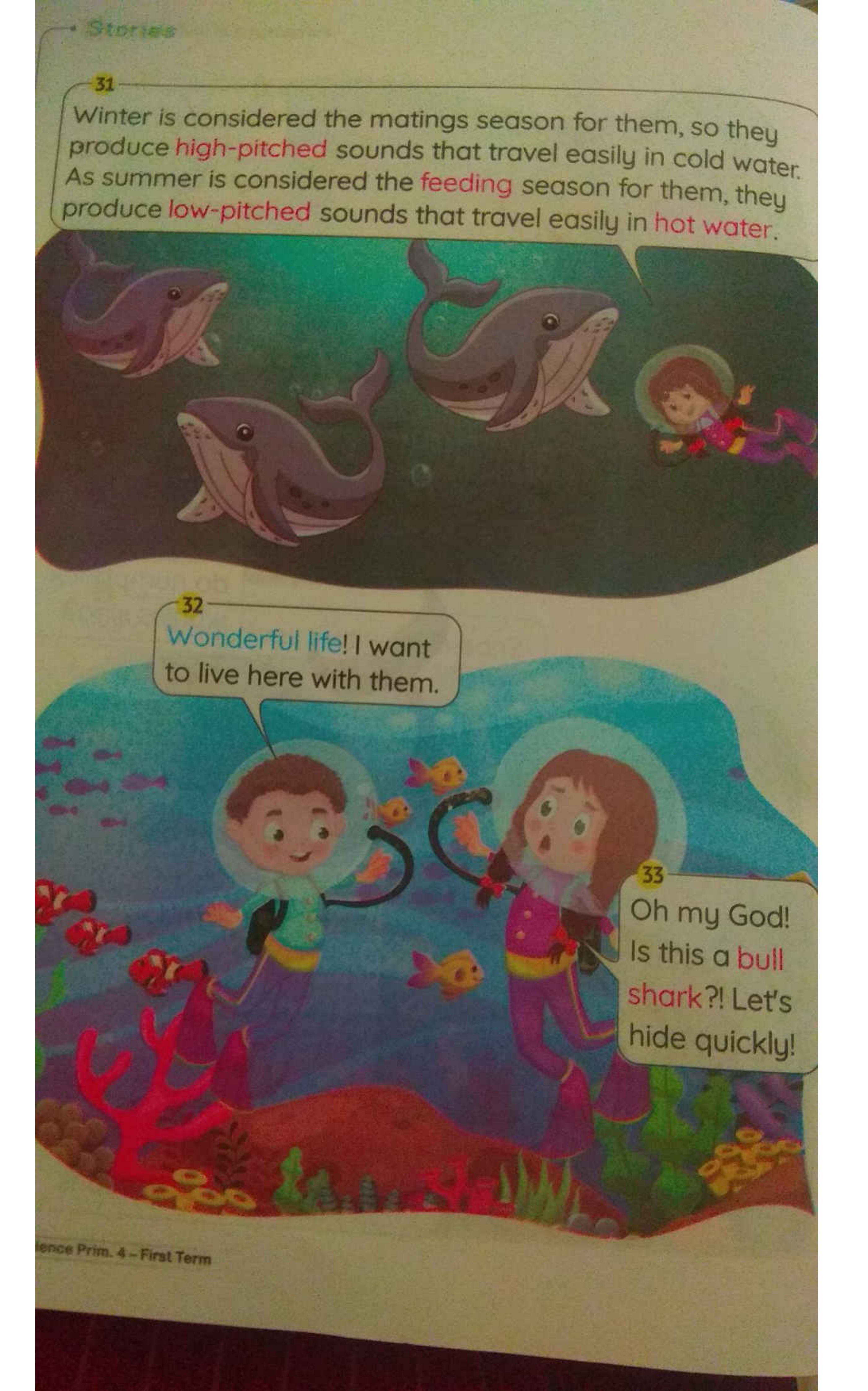

7
The nose has hair that stops dust particles.
Hair
8
Air passes from the nose and trachea to reach the two lungs.
9
Can I ask a question? What's the importance of the diaphragm?
10
The diaphragm is a large muscle that helps in respiration. t contracts downward to make oxygen gas enter to the ungs, and relaxes upward to expel carbon dioxide gas out.


11
I will ask you a very important question. Do fish breathe like humans?
12
No, fish have gills on both sides of their heads that absorb oxygen from water and expel out carbon dioxide.
13
You are genius, Adam!
SCHOOL
14
How was your first day at school?
15
It was a wonderful day. My teacher asked me and I answered her.


I think we can go diving today, you promised me.
OK Adam, eat all your food and I will bring my magic stick.
Yes, let's have a lot of fun!
Say "ocean" with me.
Ocean.
Yes! I can't believe my eyes, amazing dolphins!
You are right, dolphins are so friendly.


23
Can you tell me about dolphins?
How do they eat and hunt?
24
Dolphins use echo to locate their prey in dark water.
25
Echo! What does that word mean?
26
Dolphins produce sound waves through water, and when these waves hit any object, they reflect back to the dolphins as echo. This helps dolphins to locate the prey.


27
Amazing big fish! What is this fish's name?
28
is called a humpback whale. Did you know?
sings tones to communicate with others.
29
Amazing! Why do humpback whales sing?
30
Humpback whales sing different tones according to seasons.


31
Winter is considered the matings season for them, so they produce high-pitched sounds that travel easily in cold water. As summer is considered the feeding season for them, they produce low-pitched sounds that travel easily in hot water.
32
Wonderful life! I want to live here with them.
33
Oh my God! Is this a bull shark?! Let's hide quickly!


34
Oh, let's go back home quickly!
35
Don't be afraid, I will use my magic stick.
36
Oh, it saw me, oh my God! Please, Sara, use it now!
Science Prim. 4 – First Ter


37
Hahahahahaha, it ran away.
I am so strong.
38
Let's go
back hom
Adam, it
is not safe
here.
39
The bull shark ran away from me, I can't believe
it. Can you tell me about the bull shark?



The bull shark is a dangerous predator.
It lives in fresh or salty water.
It can hunt its prey anytime, so its prey can't predict it.
As you can see, it has sharp teeth to tear up its prey.





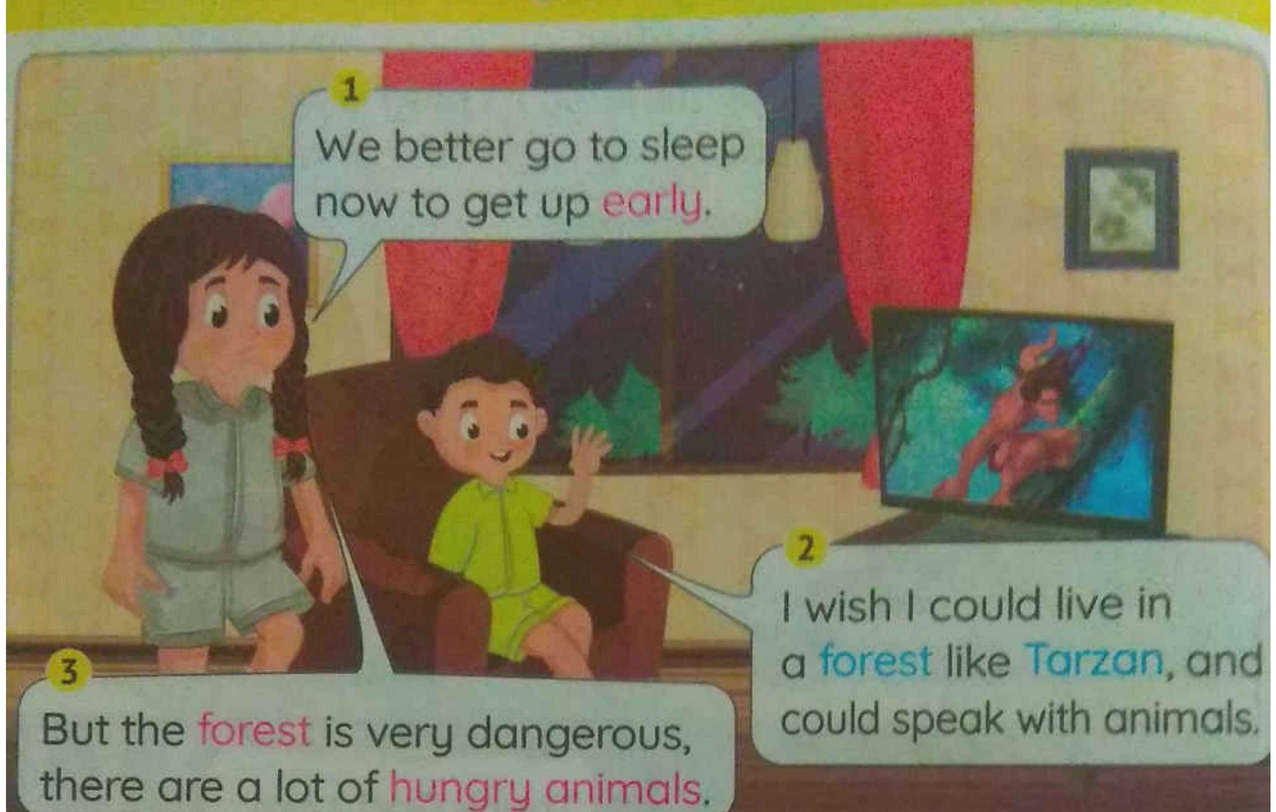
41

Thank God, I am still alive. Without you Sara, I would have been a prey.

42

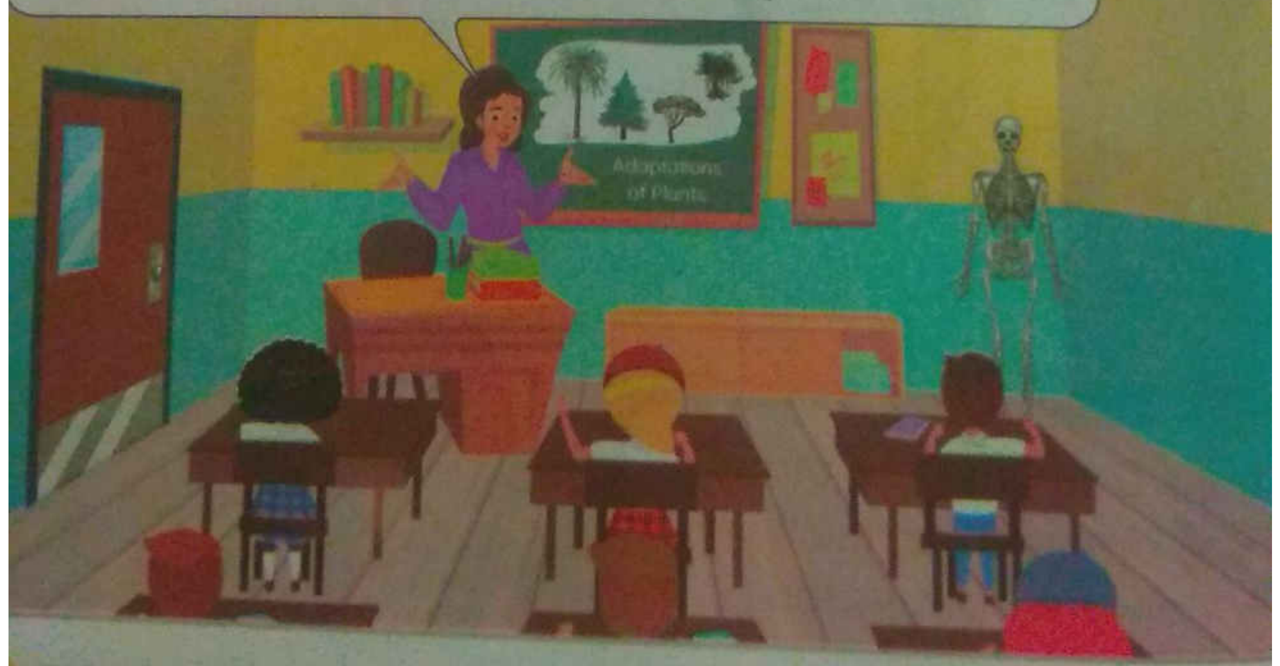
Thank God. Don't be afraid. If you are with me, the magic stick always does its job.

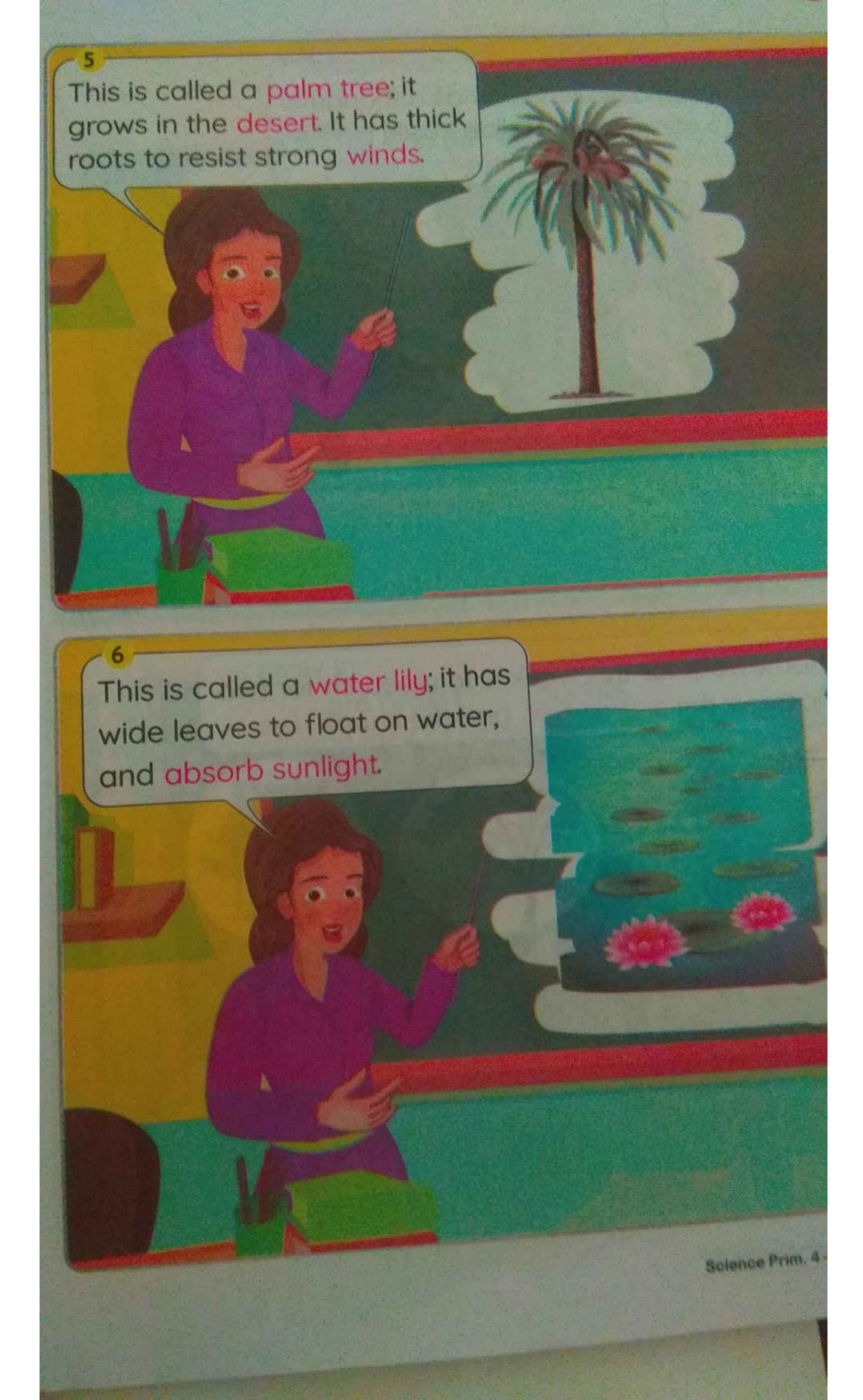
4 Journey to the Forest

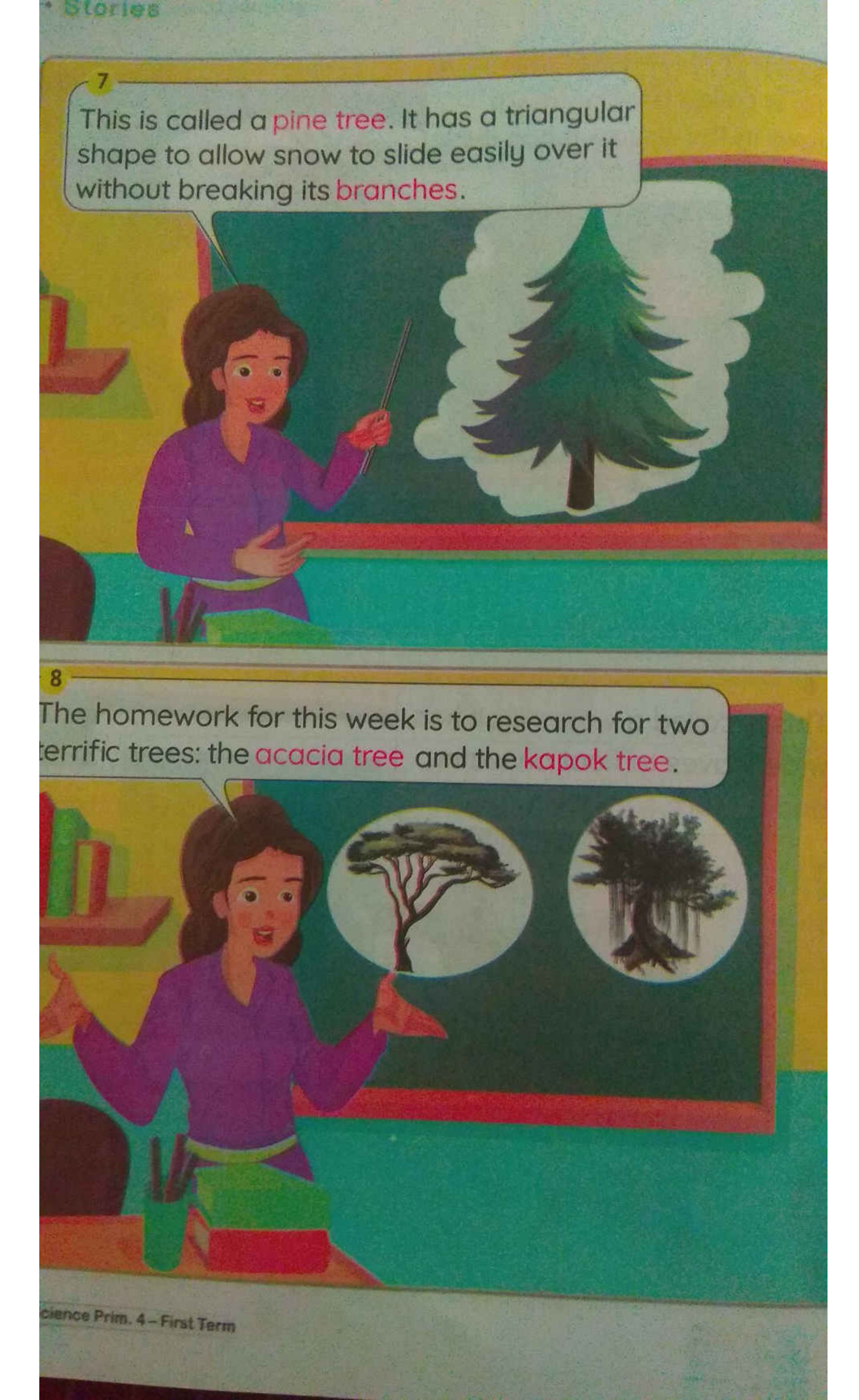


Next Day at School

4 Today, we will talk about the adaptations of plants. Plants can grow everywhere; they can adapt to different conditions. Look at these figures.

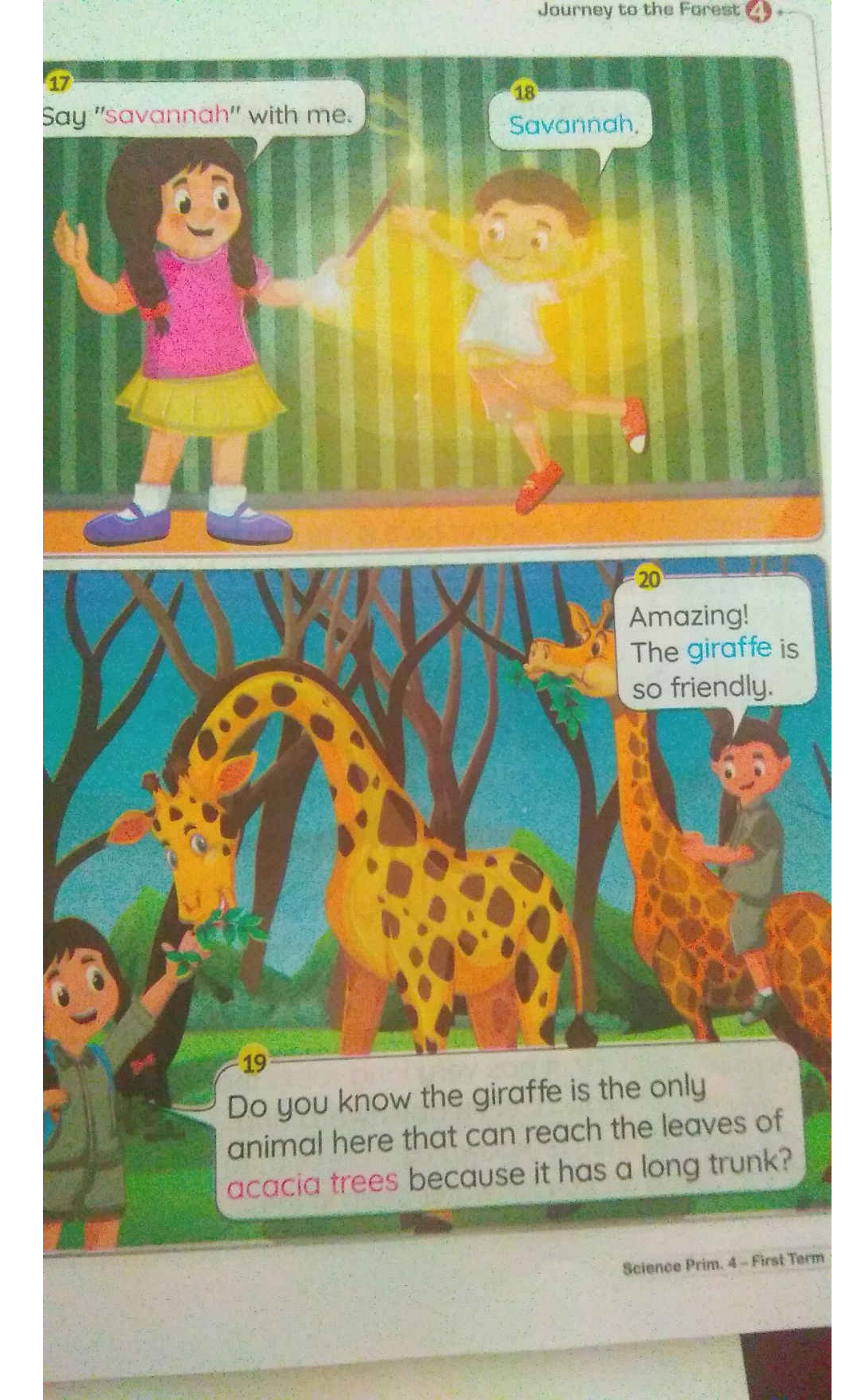



5
This is called a palm tree; it grows in the desert. It has thick roots to resist strong winds.
6
This is called a water lily; it has wide leaves to float on water, and absorb sunlight.


7
This is called a pine tree. It has a triangular shape to allow snow to slide easily over it without breaking its branches.
8
The homework for this week is to research for two terrific trees: the acacia tree and the kapok tree.


In the Afternoon
9
Can you help me with my research?
10
What's your research about, Adam?
11
My research is about two terrific trees: the acacia tree and the kapok tree.
12
cacia trees grow in savannah forests.
avannah forests are grassland habitats.
here is an extreme lack of water, and drought conditions.


13
The kapok tree grows in the Amazon rainforest. It is a rainforest, where it is easy to find water.
14
Can we go there, please?
15
But the forest is very dangerous, you must stay close to me.
16
OK, I promise you, I will do everything you want.


17
Say "savannah" with me.
18
Savannah.
19
Do you know the giraffe is the only animal here that can reach the leaves of acacia trees because it has a long trunk?
20
Amazing! The giraffe is so friendly.

21

Sometimes it defends itself by producing a poison when an animal eats its leaves. It also has a sharp spine.

22

Amazing! But the weather here is dry and hot, how does an acacia tree get water to grow like that?

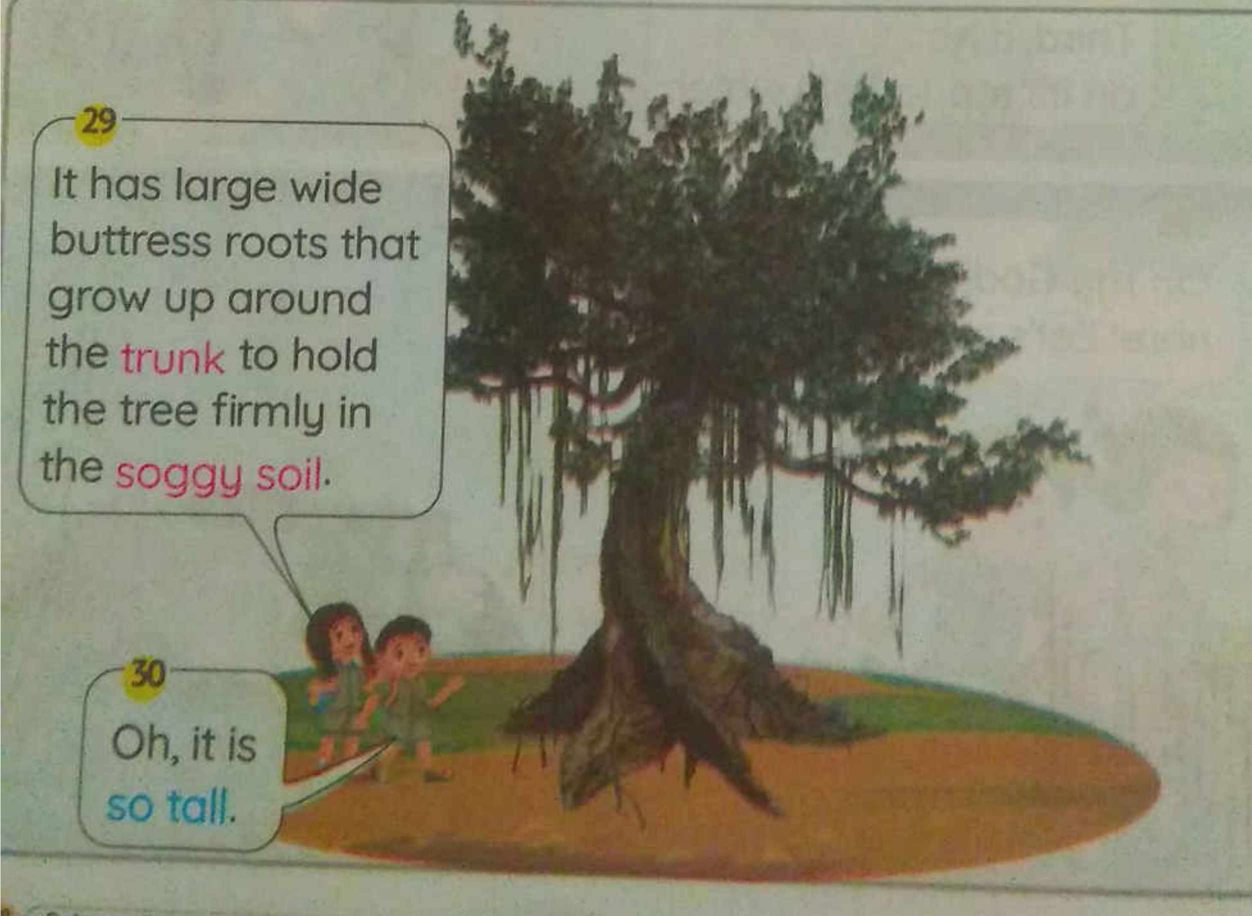
23

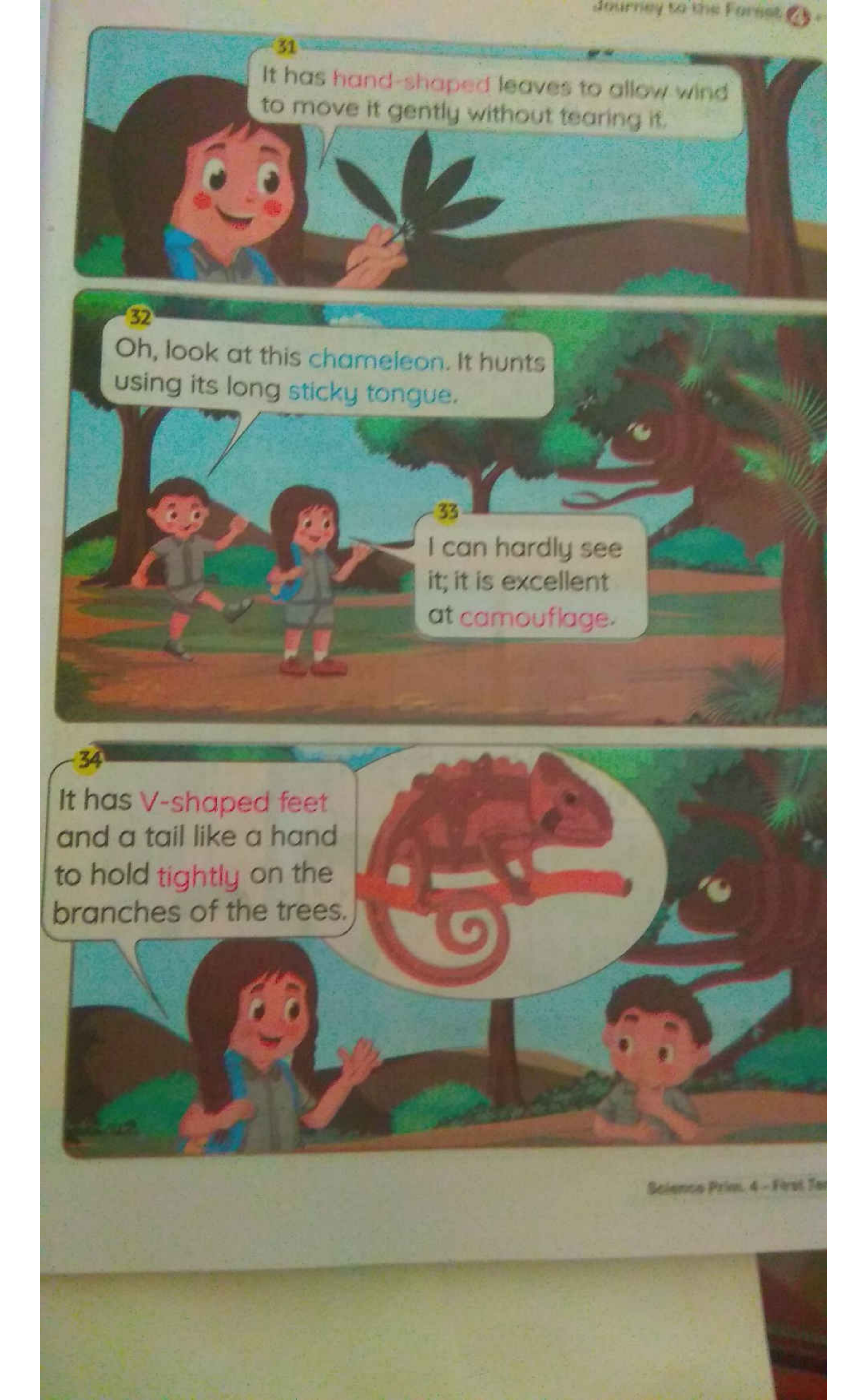
In many ways, Adam.
First, it has very long roots that grow directly downward and they're known as "taproot", to search for water deep in the soil.


24
Second, it stores water in its trunk as a camel stores fats in its hump.
25
Third, it has tiny leaves on its top to hold water.
26
Oh my God! There's a lion here! Let's escape quickly.

27
Oh, thank God. Where are we now?

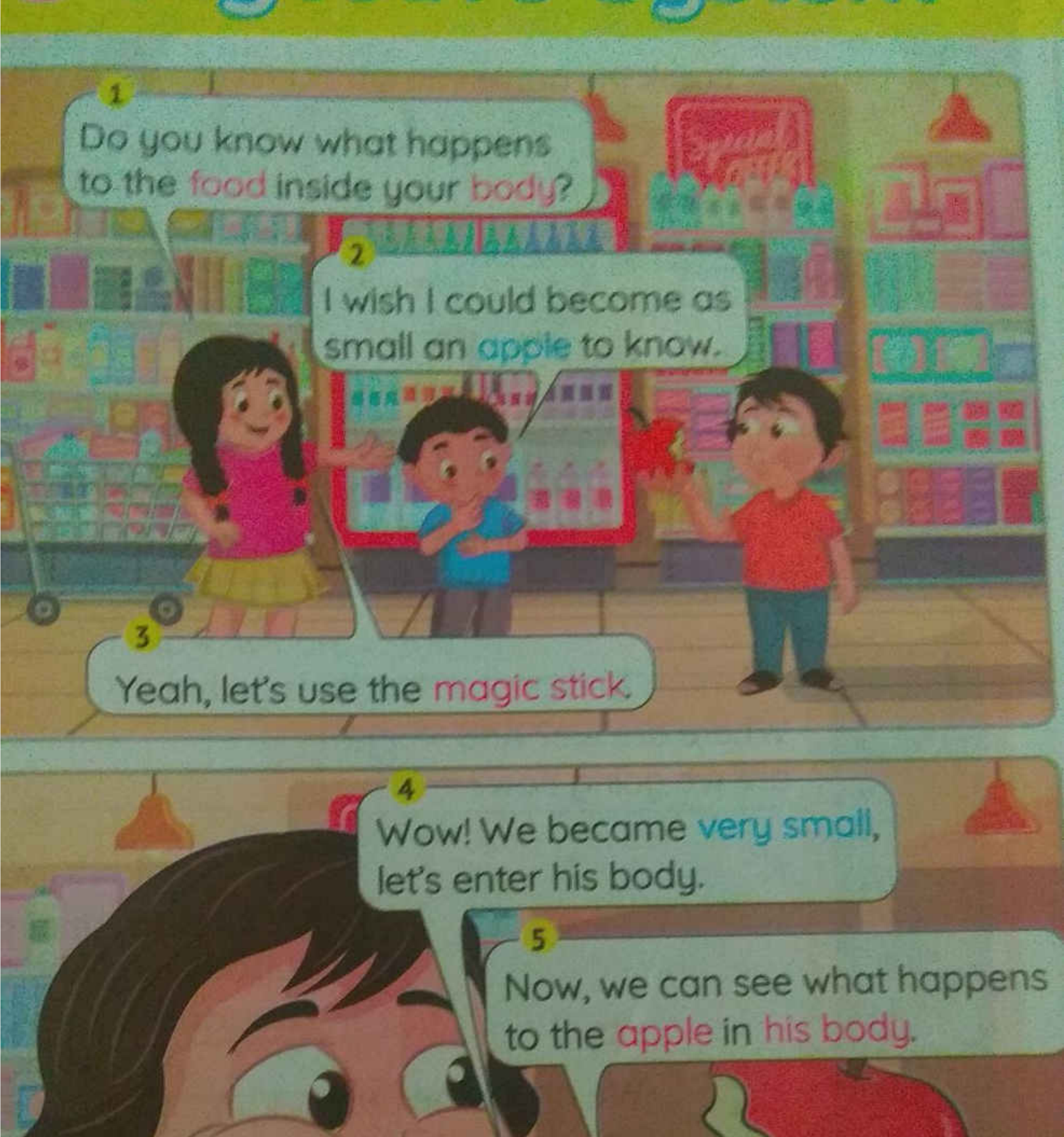
28
We are in the Amazon forest. It is very dangerous here too, so let's take a look at the kapok tree and go back home quickly.

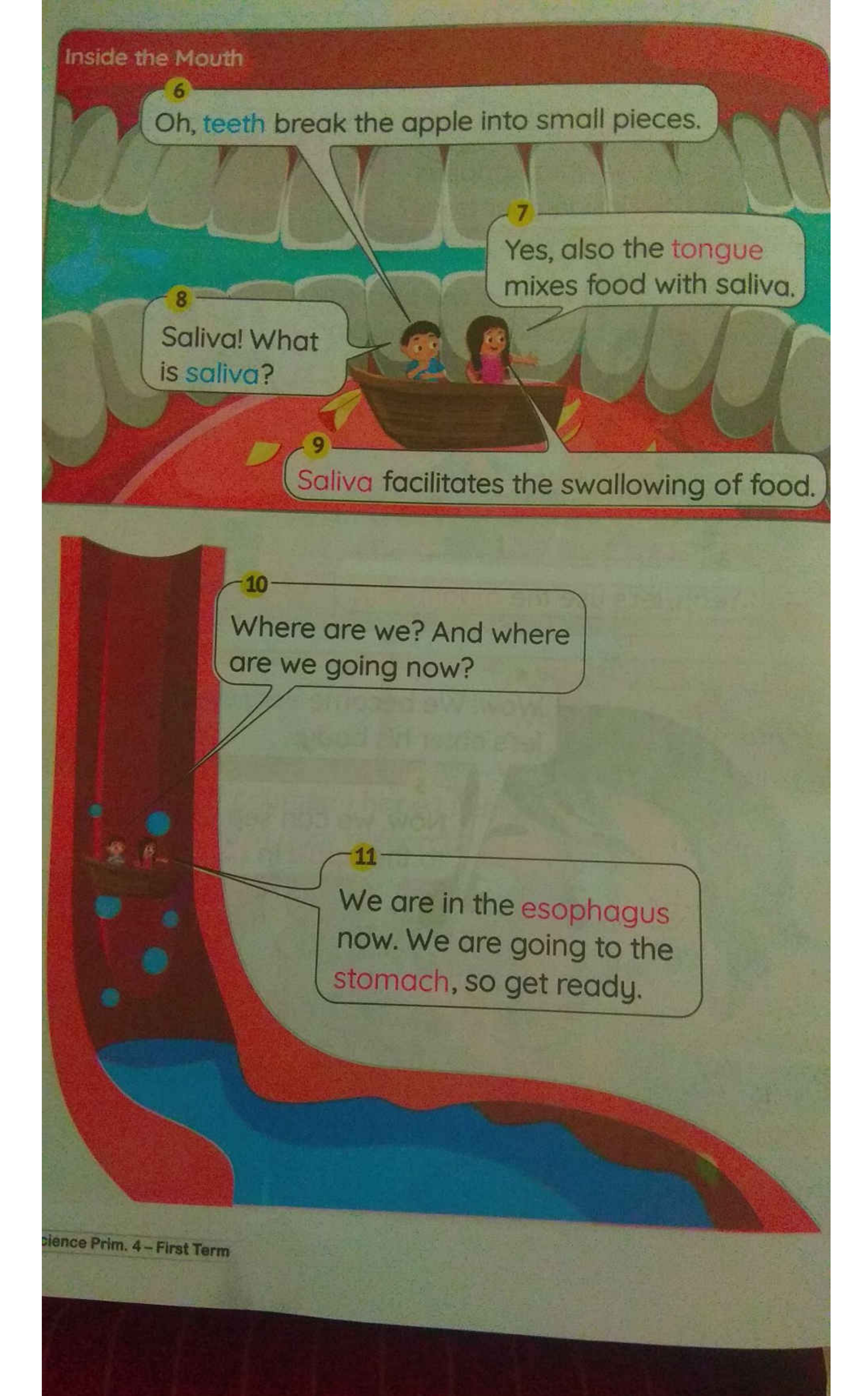


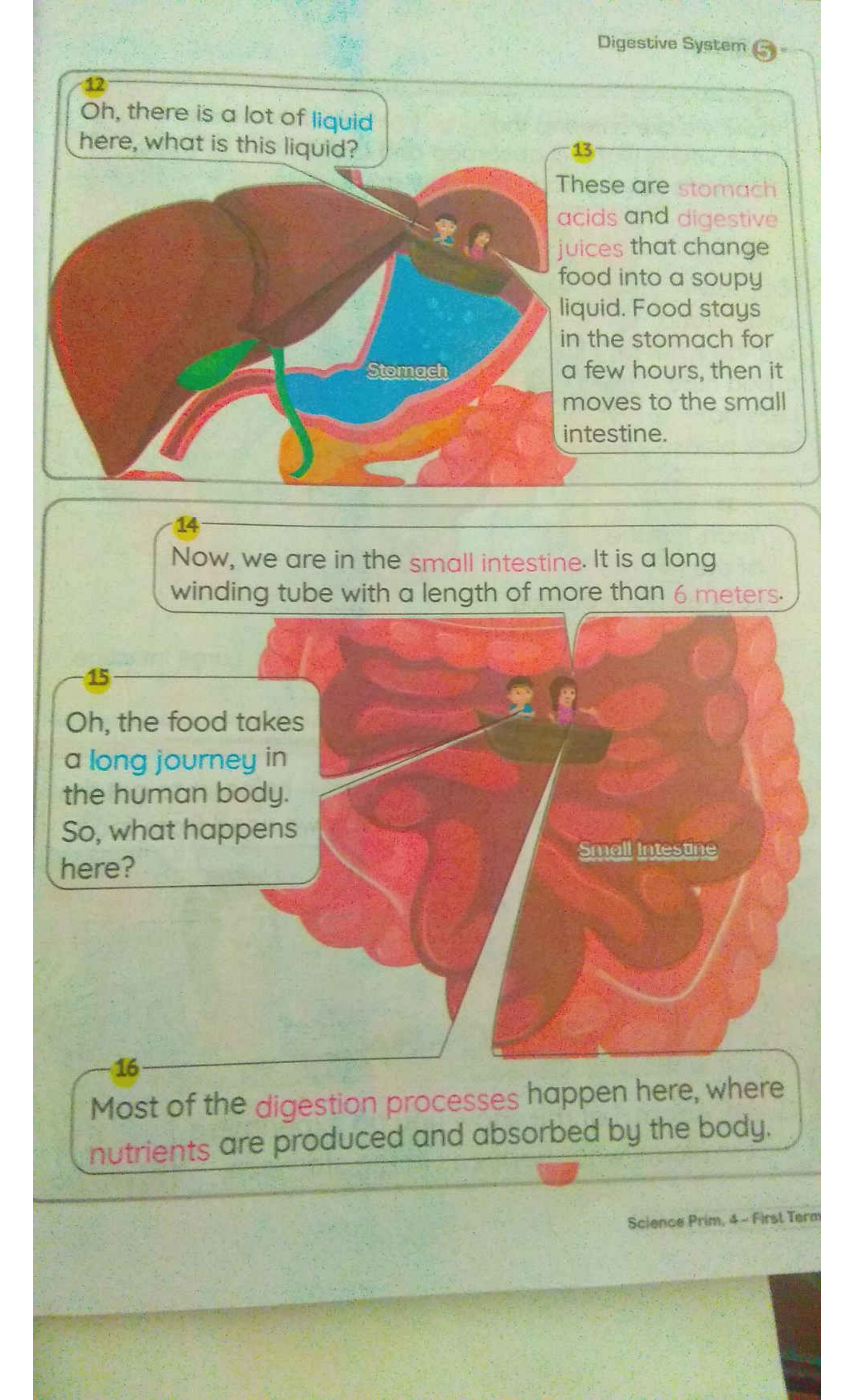

31
It has hand-shaped leaves to allow wind to move it gently without tearing it.
32
Oh, look at this chameleon. It hunts using its long sticky tongue.
33
I can hardly see it; it is excellent at camouflage.
34
It has V-shaped feet and a tail like a hand to hold tightly on the branches of the trees.

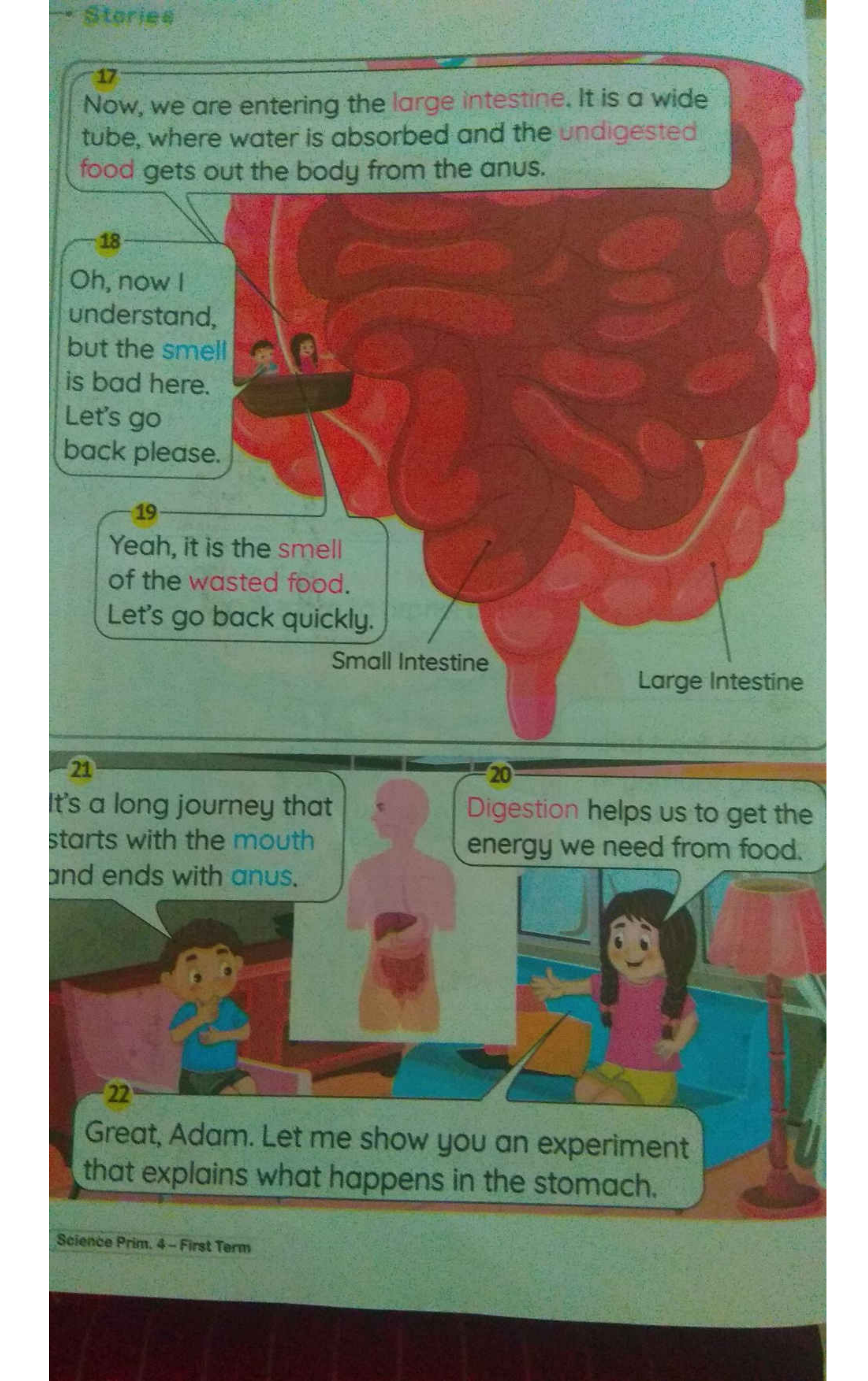

35
Can we take it? It is so cute.
36
It is better to leave it in its natural habitat, let's go back.
37
What an amazing day! Thank you, Sara.
38
Of courses, I hope I helped you in your research.
39
Yes of course, now I can start to do it.

5 Digestive System




Inside the Mouth
6
Oh, teeth break the apple into small pieces.
7
Yes, also the tongue mixes food with saliva.
8
Saliva! What is saliva?
9
Saliva facilitates the swallowing of food.
10
Where are we? And where are we going now?
11
We are in the esophagus now. We are going to the stomach, so get ready.


12
Oh, there is a lot of liquid here, what is this liquid?
13
These are stomach acids and digestive juices that change food into a soupy liquid. Food stays in the stomach for a few hours, then it moves to the small intestine.
Stomach
14
Now, we are in the small intestine. It is a long winding tube with a length of more than 6 meters.
15
Oh, the food takes a long journey in the human body. So, what happens here?
Small Intestine
16
Most of the digestion processes happen here, where nutrients are produced and absorbed by the body.


17
Now, we are entering the large intestine. It is a wide tube, where water is absorbed and the undigested food gets out the body from the anus.
18
Oh, now I understand, but the smell is bad here. Let's go back please.
19
Yeah, it is the smell of the wasted food. Let's go back quickly.
Small Intestine
Large Intestine
20
Digestion helps us to get the energy we need from food.
21
It's a long journey that starts with the mouth and ends with anus.
22
Great, Adam. Let me show you an experiment that explains what happens in the stomach.


23
Why did you cut the apple?
24
Because food enters the stomach in small pieces.
25
We will put small pieces of an apple in the acid and wait for a few hours.
After a Few Hours
26
Amazing! It's like magic!
27
Hahaha, I didn't use the magic stick.
28
Now I understand everything.

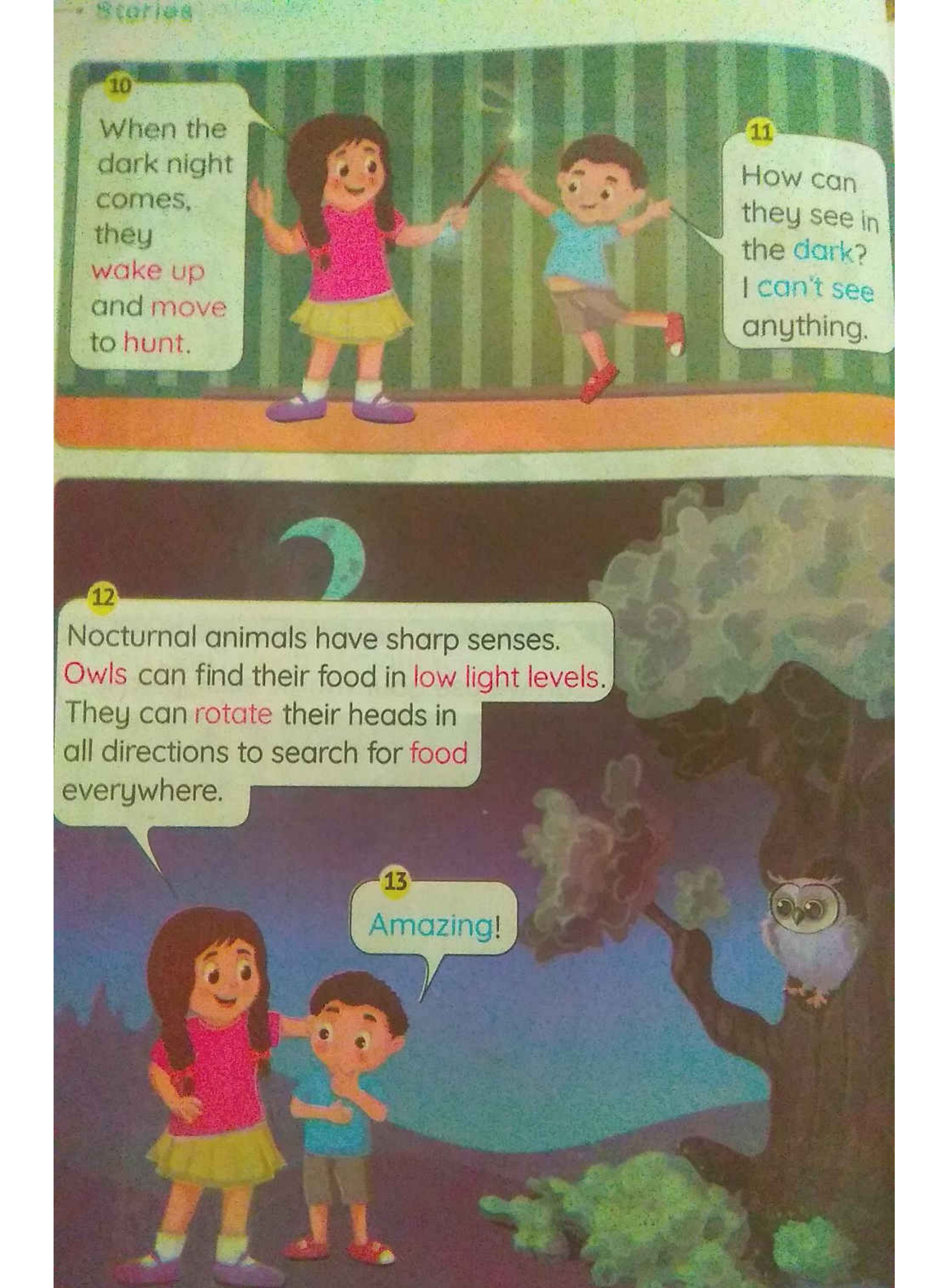
6 Nocturnal Animals

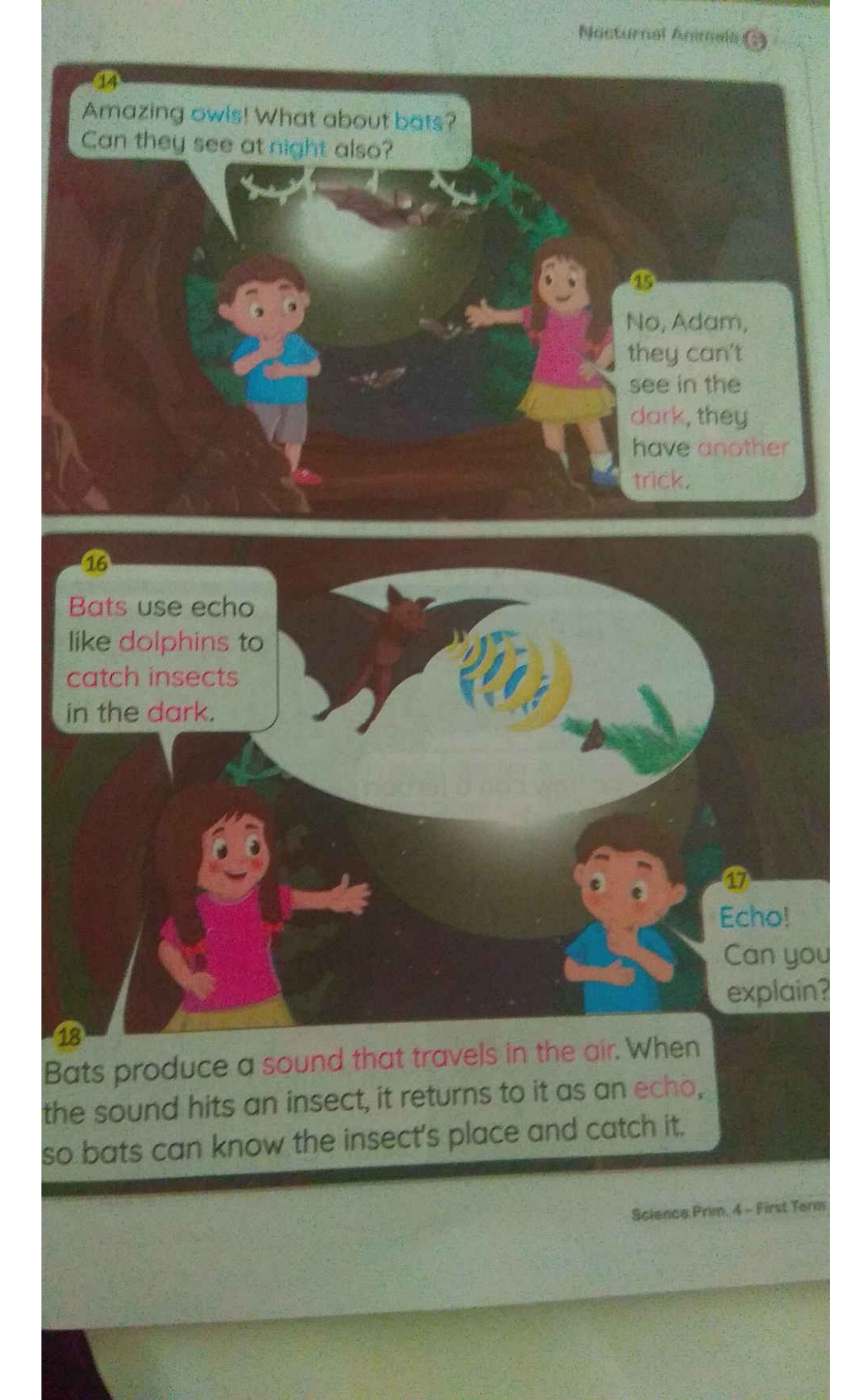


Nocturnal animals! What are those?

They are animals that sleep during the day and wake up at night. The night for them is like the day for us.

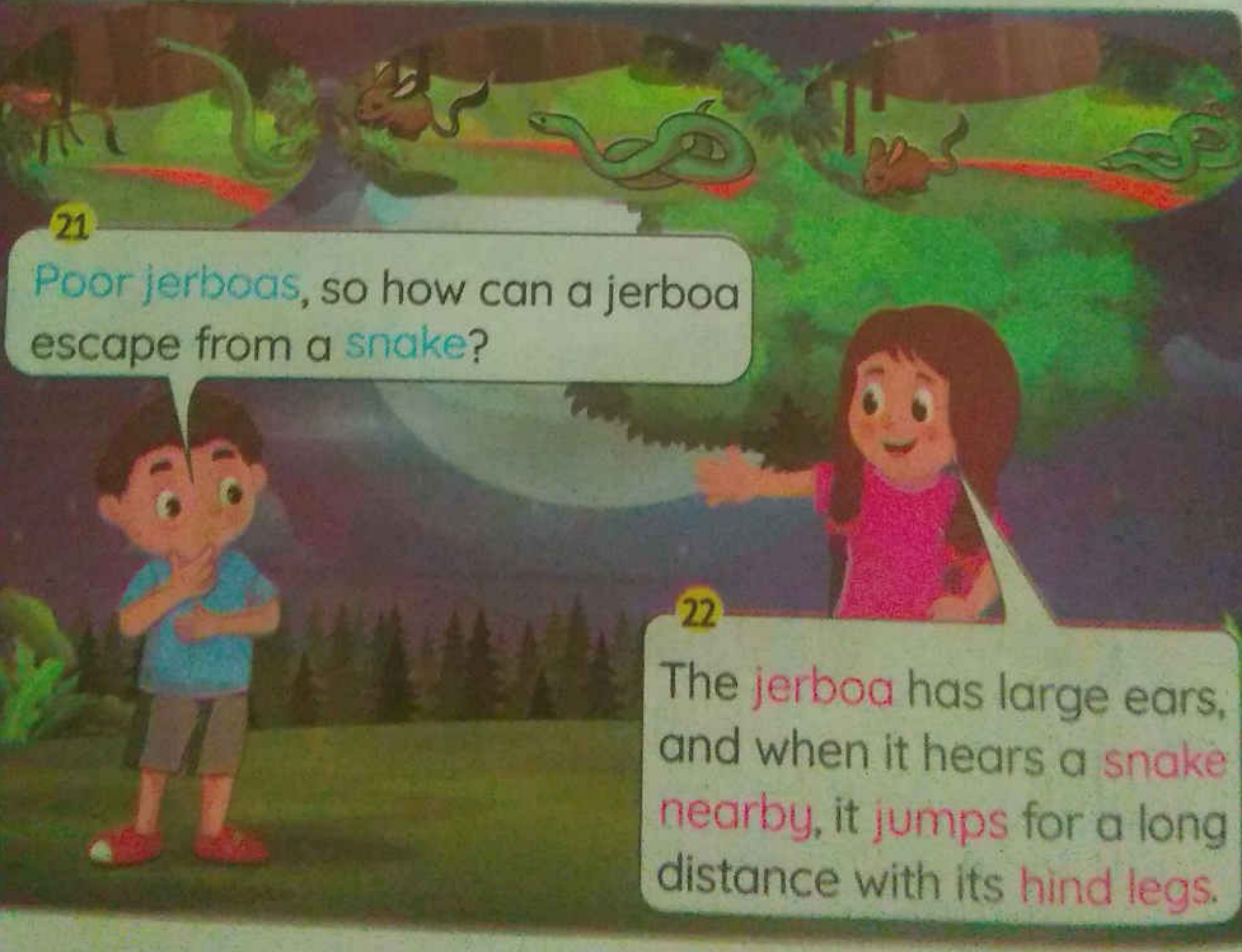

6
Are there other nocturnal animals?
7
There are a lot of them, like owls, bats, snakes, and jerboas.
8
Can we use your magic stick, please?
9
It is too late, but let's have some fun.

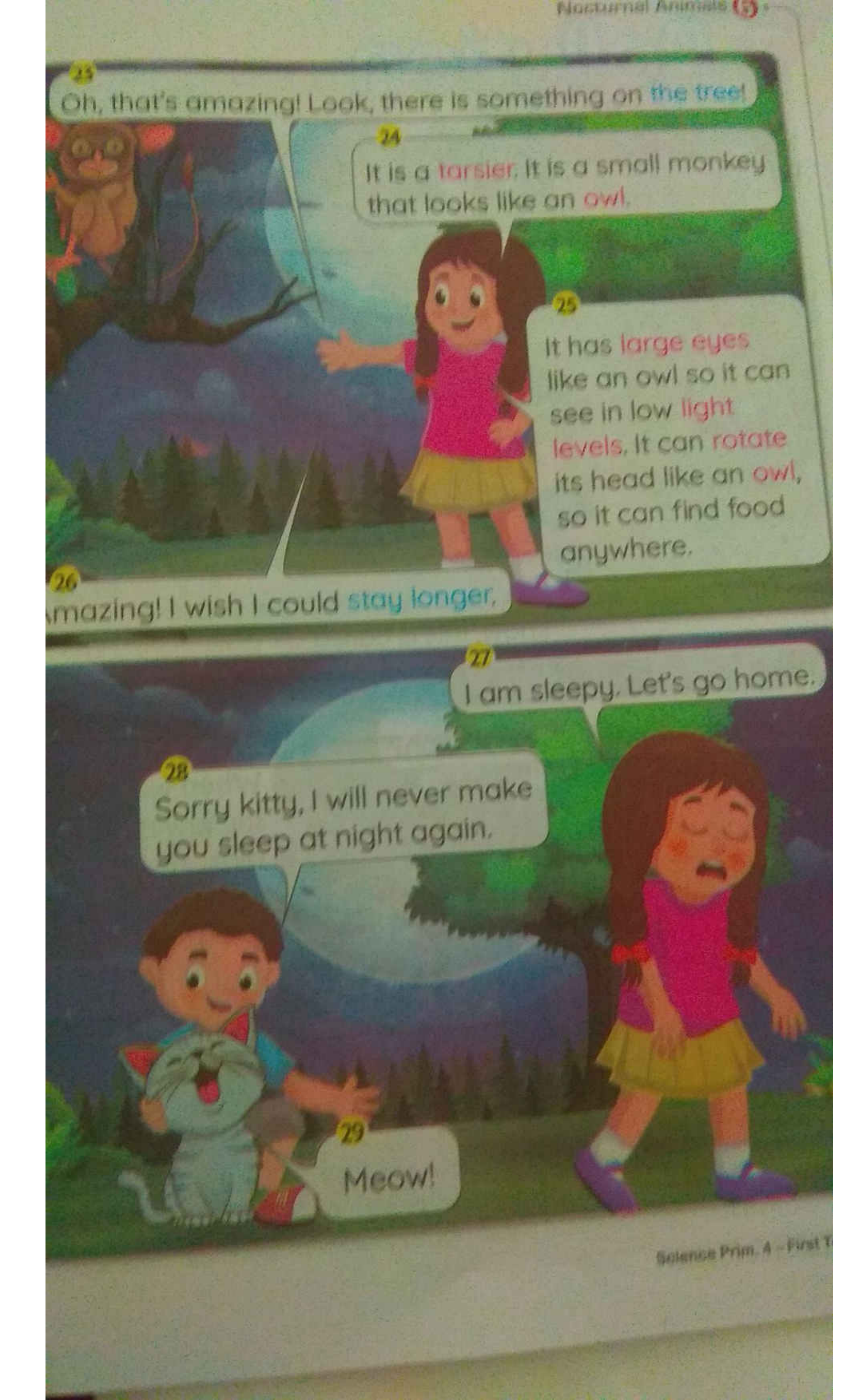

10
When the dark night comes, they wake up and move to hunt.
11
How can they see in the dark? I can't see anything.
12
Nocturnal animals have sharp senses. Owls can find their food in low light levels. They can rotate their heads in all directions to search for food everywhere.
13
Amazing!


14
Amazing owls! What about bats? Can they see at night also?
15
No, Adam, they can't see in the dark, they have another trick.
16
Bats use echo like dolphins to catch insects in the dark.
17
Echo! Can you explain?
18
Bats produce a sound that travels in the air. When the sound hits an insect, it returns to it as an echo, so bats can know the insect's place and catch it.

19 Amazing! What about snakes?

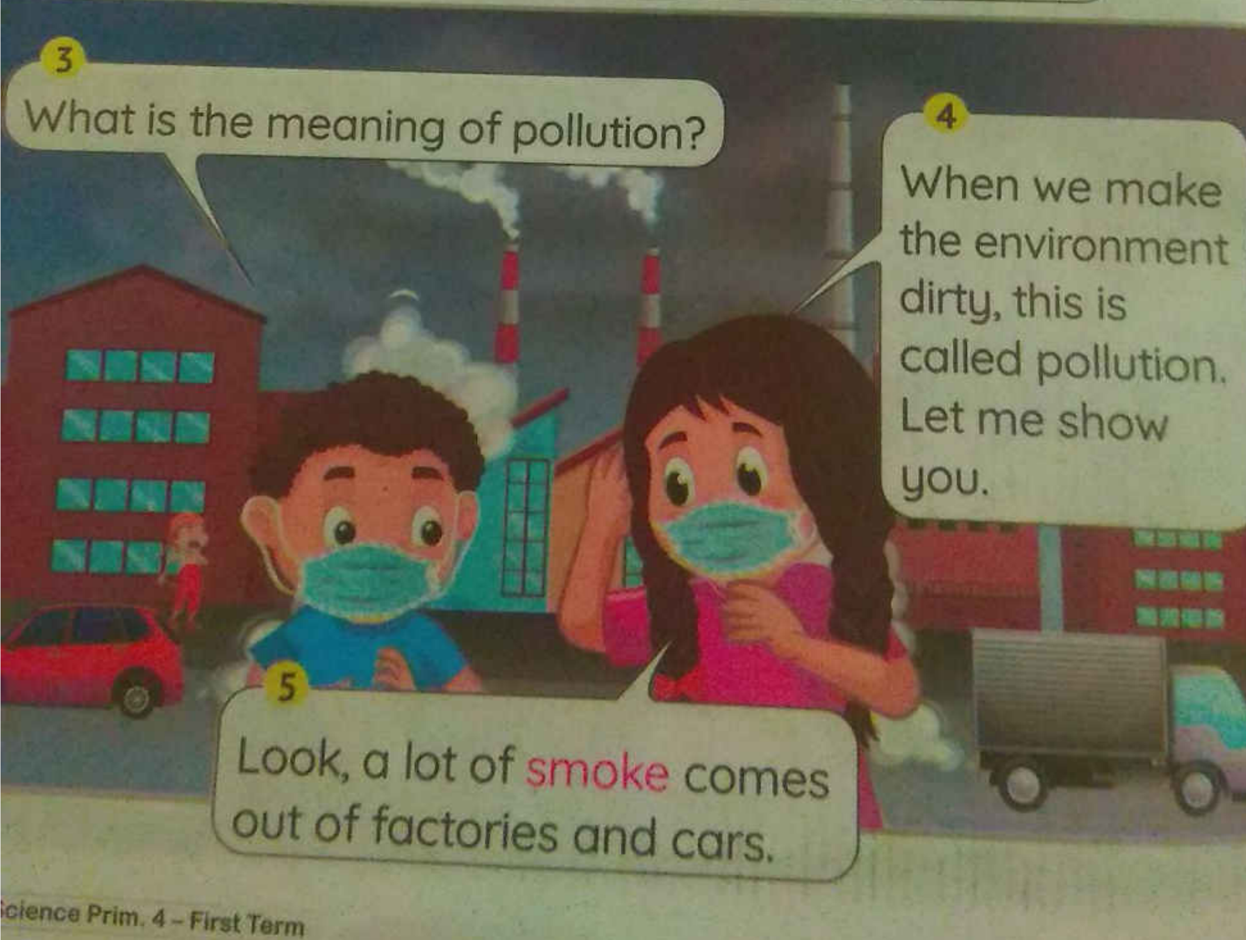
20 Snakes are like bats, they can't see in the dark, but they can sense the heat of their prey. At night, they search for jerboas to eat.

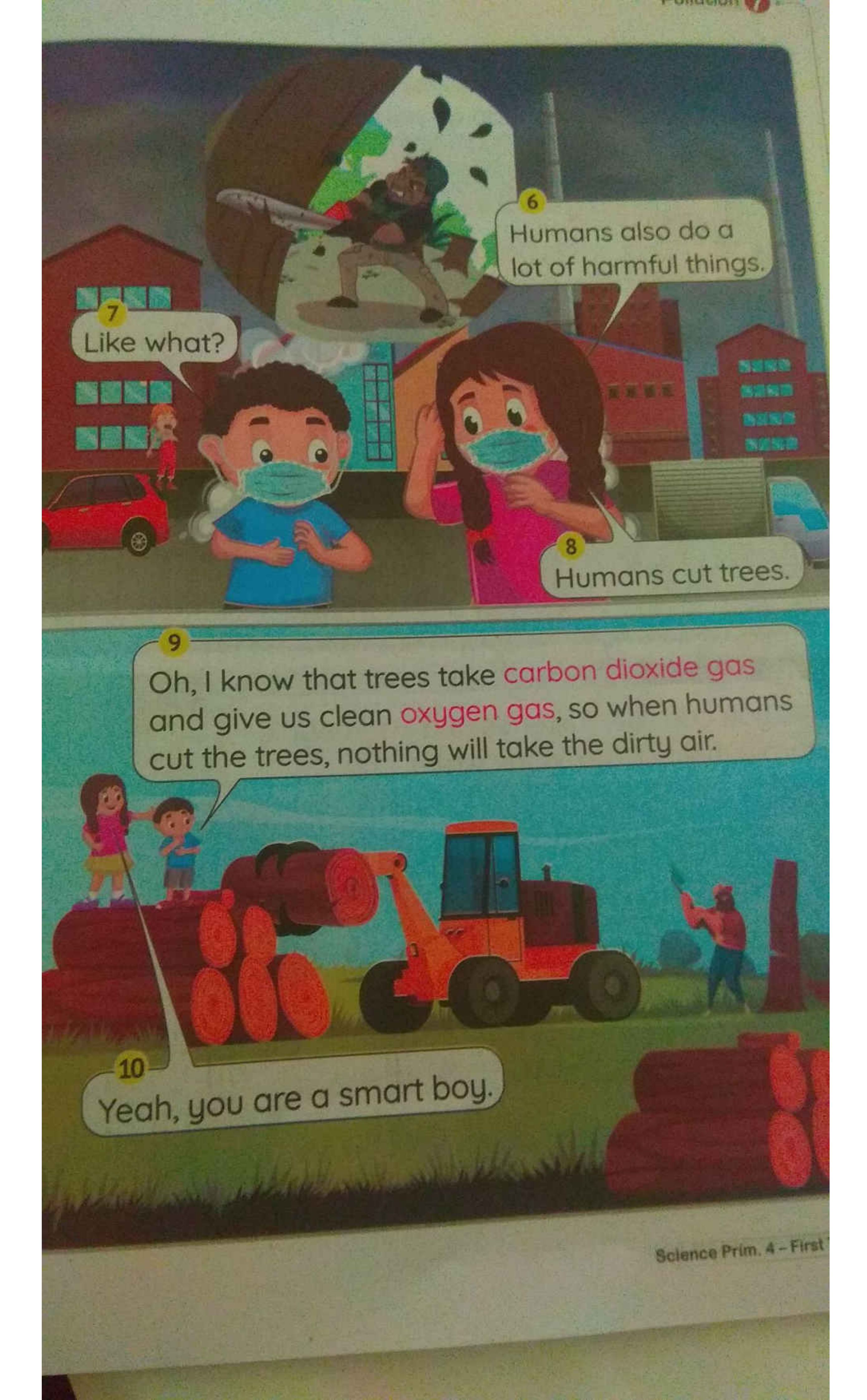



23
Oh, that's amazing! Look, there is something on the tree!
24
It is a tarsier. It is a small monkey that looks like an owl.
25
It has large eyes like an owl so it can see in low light levels. It can rotate its head like an owl, so it can find food anywhere.
26
mazing! I wish I could stay longer.
27
I am sleepy. Let's go home.
28
Sorry kitty, I will never make you sleep at night again.
29
Meow!

7 Pollution


Oh, I am not fine, I can't even breathe or see.
Yes, your eyes became red. You know, this is called air pollution.


What is the meaning of pollution?
When we make the environment dirty, this is called pollution. Let me show you.
Look, a lot of smoke comes out of factories and cars.

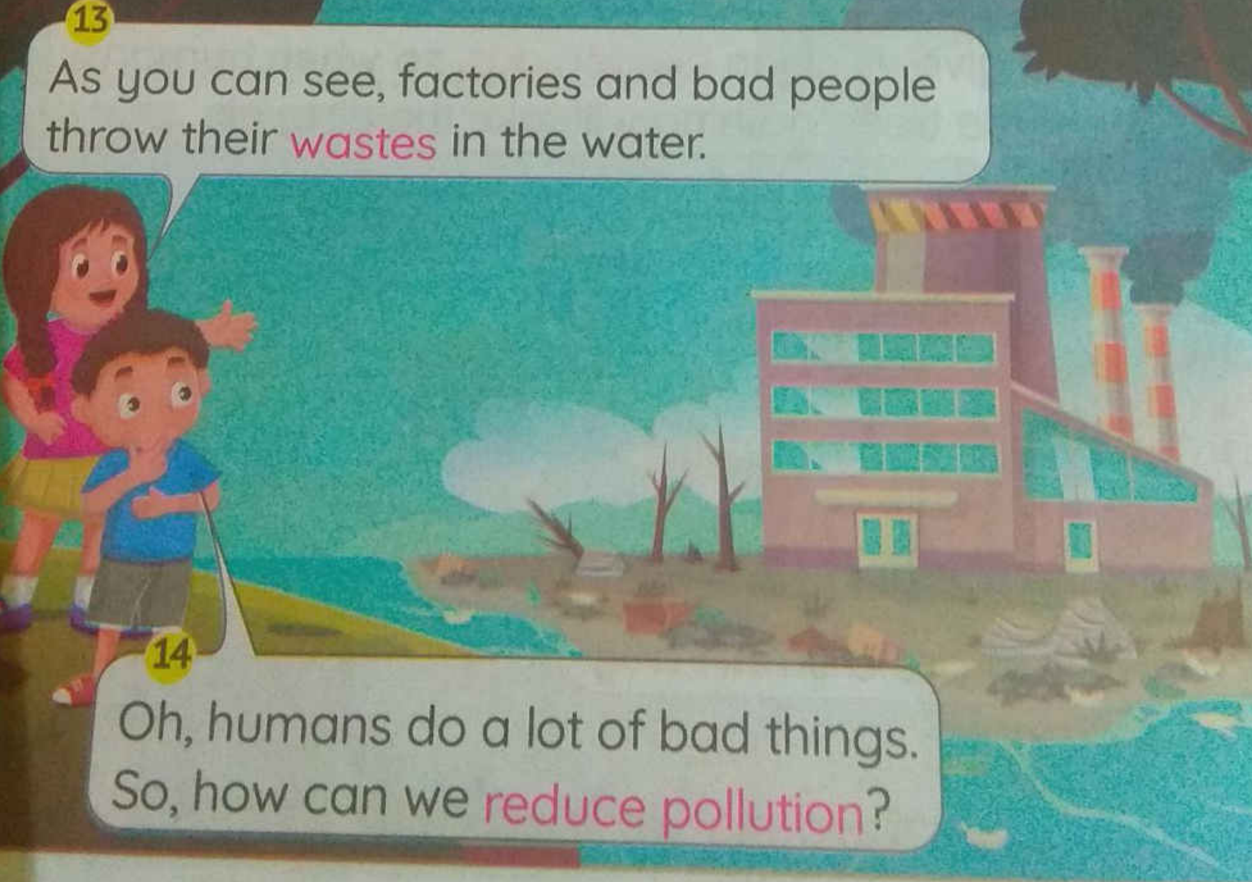

6
Humans also do a lot of harmful things.
7
Like what?
8
Humans cut trees.
9
Oh, I know that trees take carbon dioxide gas and give us clean oxygen gas, so when humans cut the trees, nothing will take the dirty air.
10
Yeah, you are a smart boy.

11

Did you know that water pollution is more dangerous than air pollution?

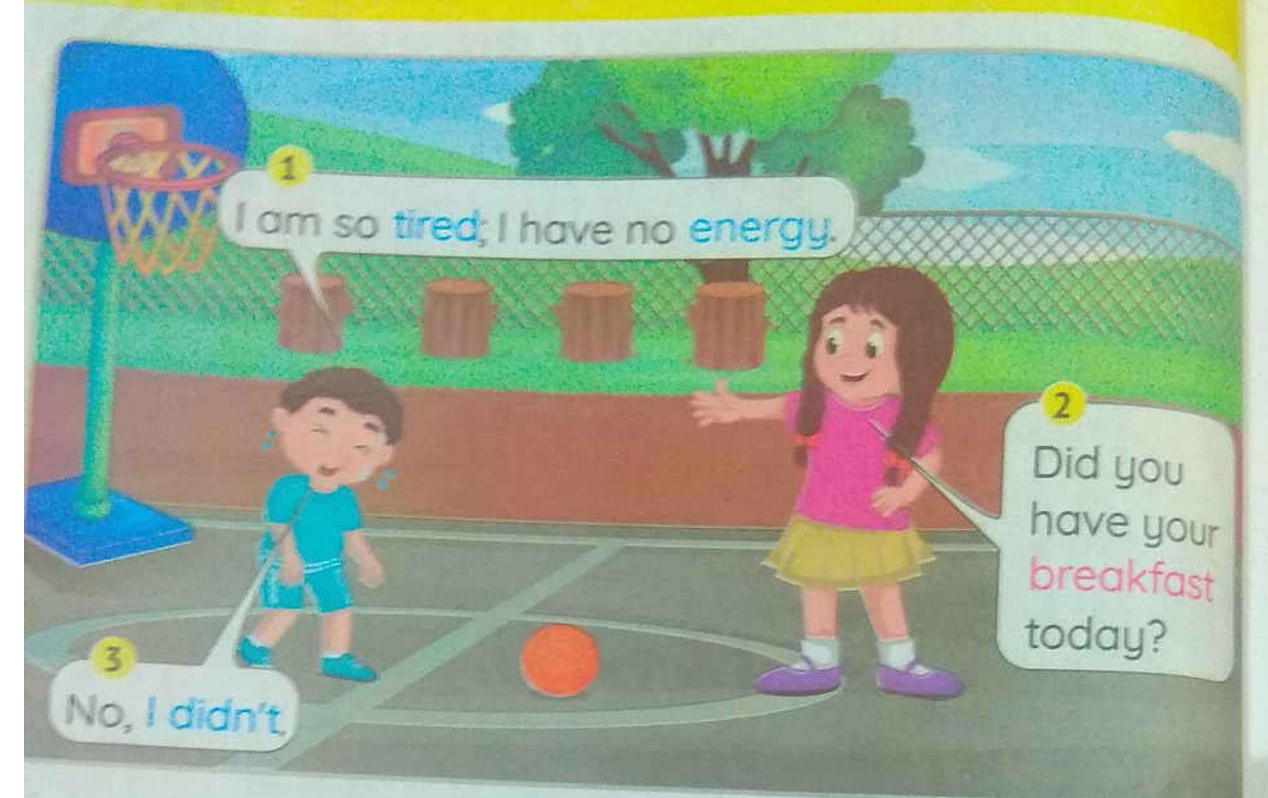
12

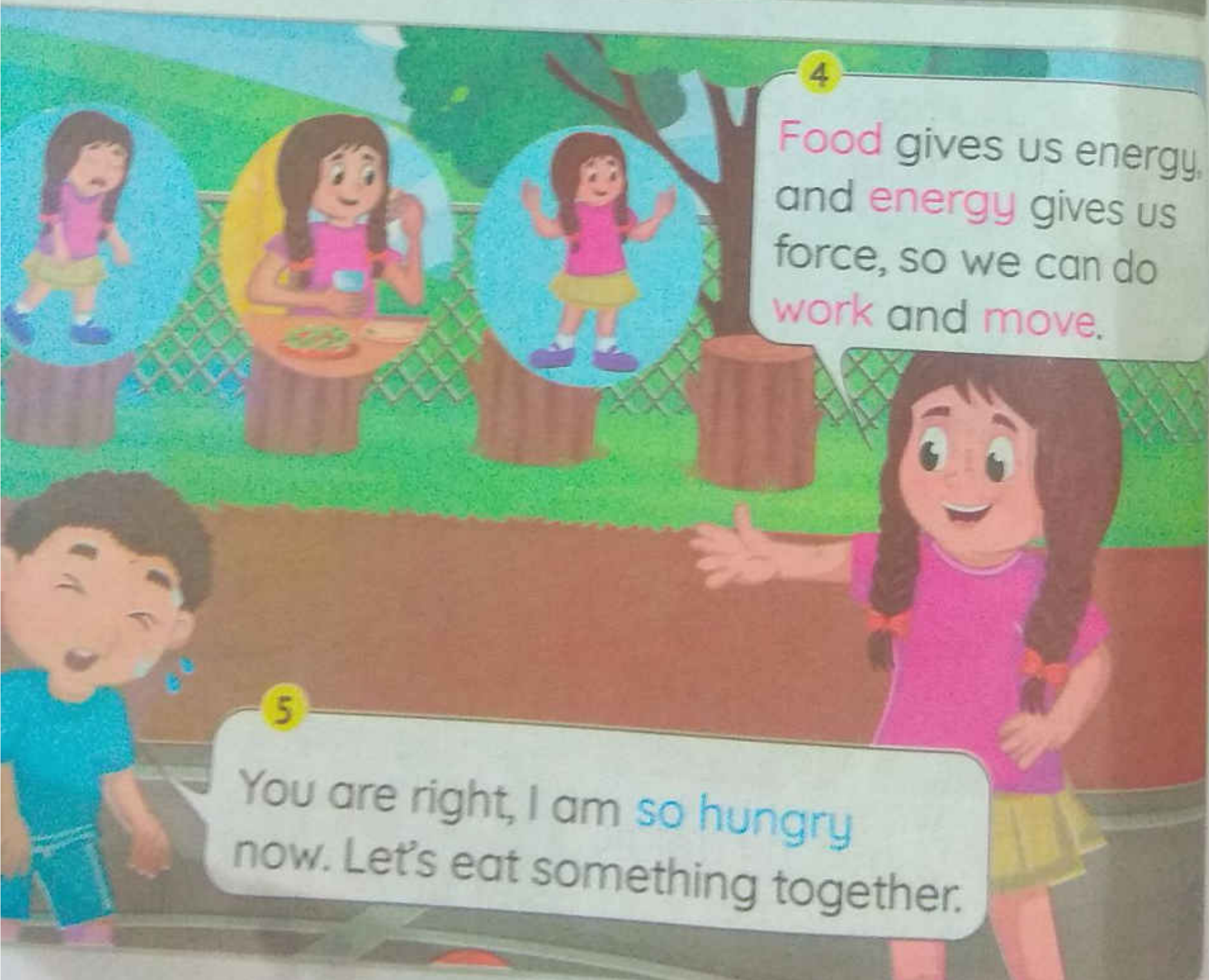
Yeah, because fish die, but how is water polluted?



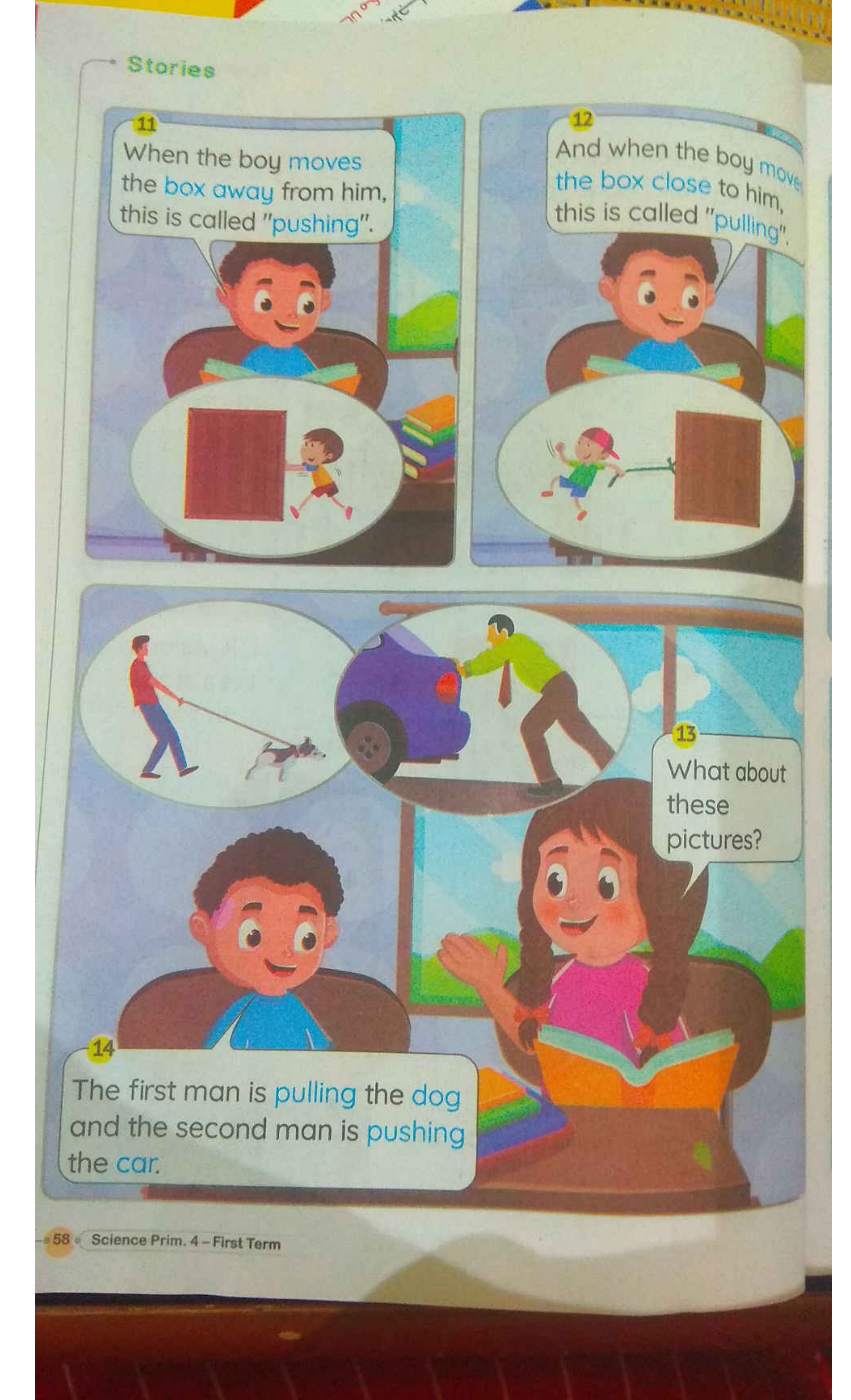

We shouldn't throw wastes in the water.
We should ride bikes instead of driving cars.
We should grow more and more trees.
16
Amazing! Let's go home.
I am very excited about growing
new plants in our home garden.
17
OK, let's use the magic
stick to go home.

8 Push and Pull

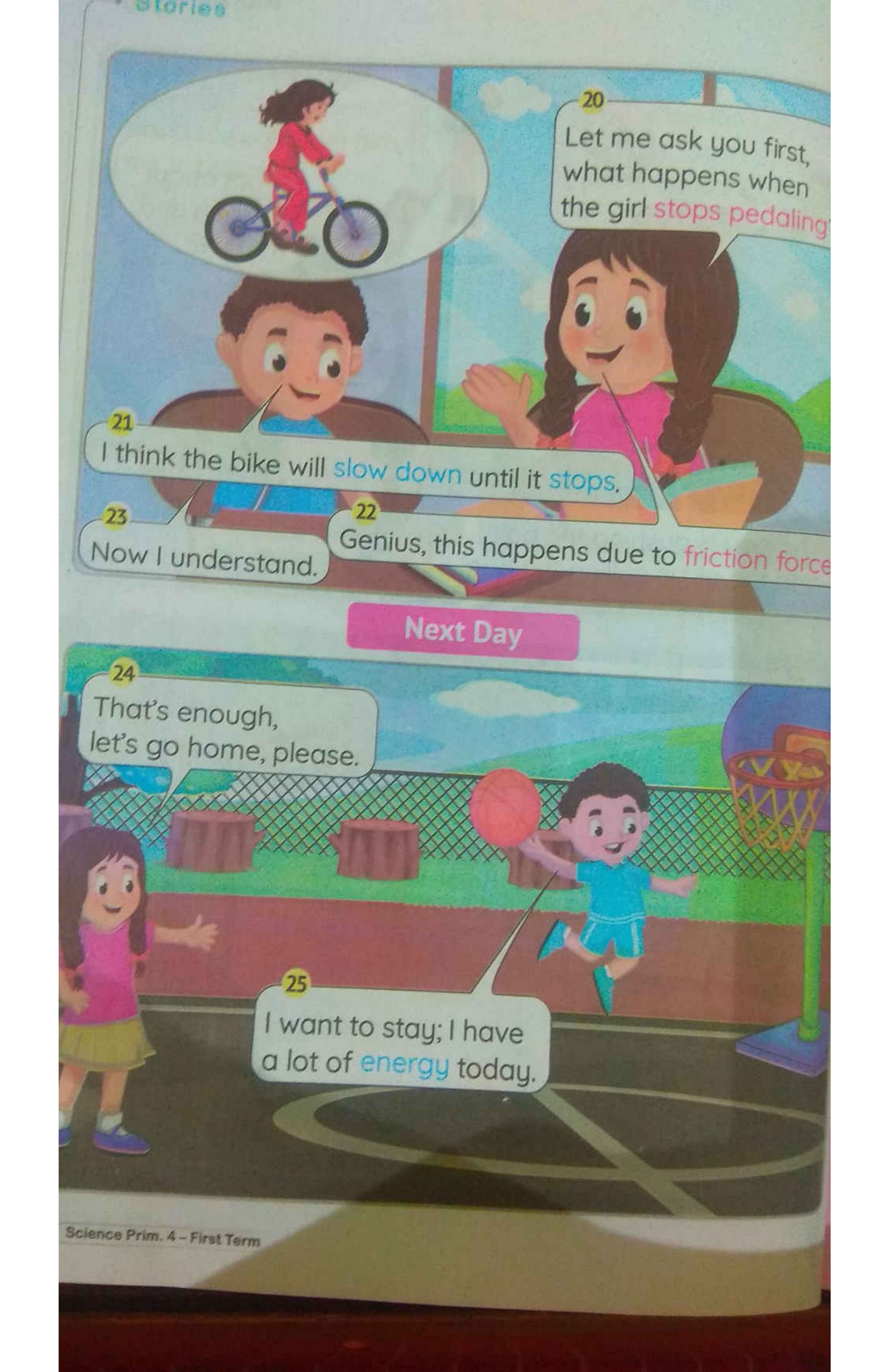


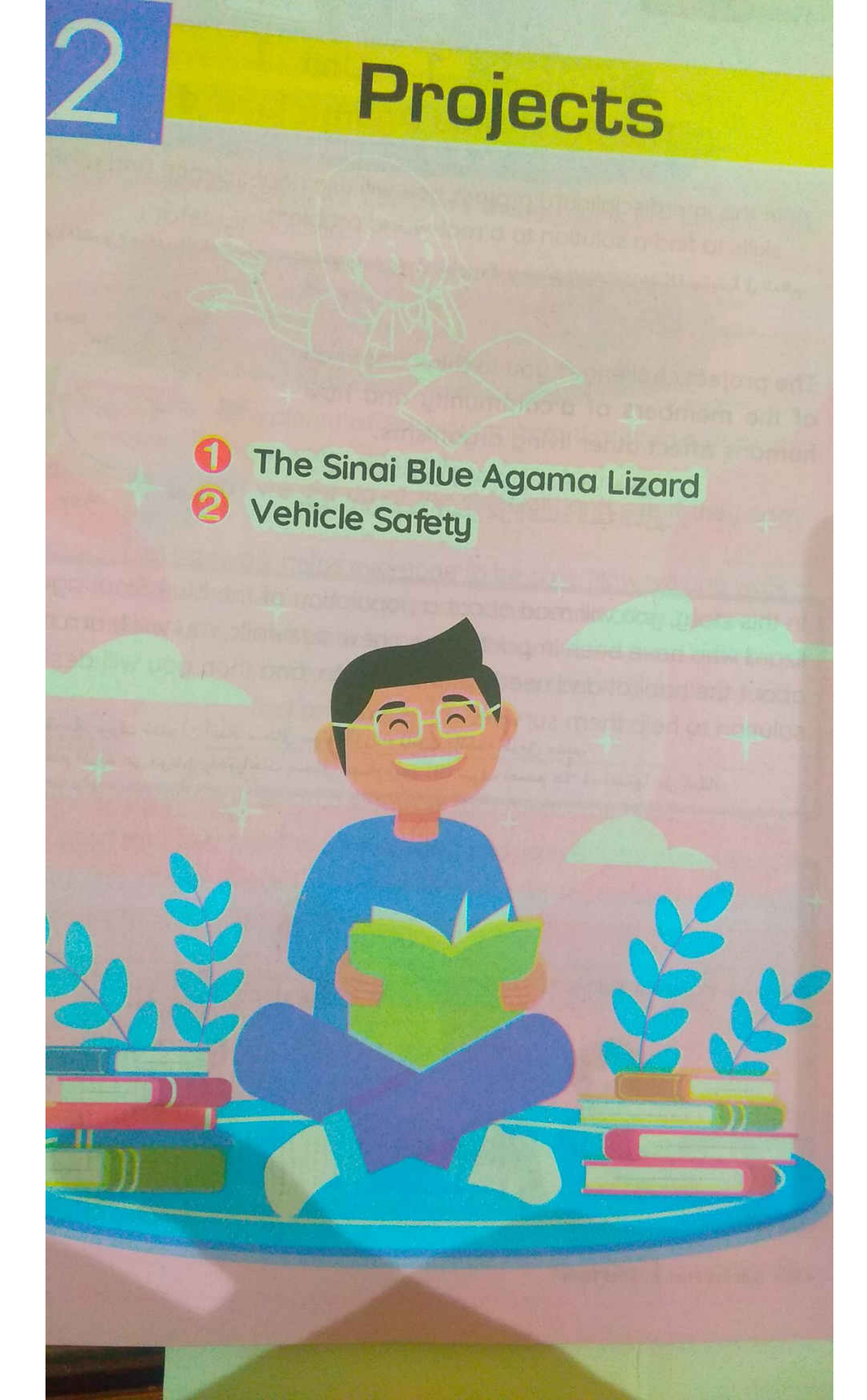



6
We took a science lesson that talks about pushing and pulling forces.
7
Great, let's play an amazing game. I will show you some pictures, and you can say "push" or "pull".
8
Amazing! Let's start.
9
OK, Adam. Let's start with the first picture.
, the boy with the yellow T-shirt
shes the box, while the boy with
green T-shirt pulls the box.


Stories
11
When the boy moves the box away from him, this is called "pushing".
12
And when the boy moves the box close to him, this is called "pulling".
13
What about these pictures?
14
The first man is pulling the dog and the second man is pushing the car.


15
What about the boy and the girl?
16
The boy is pushing the ball and the girl is pulling the bag.
17
Excellent, Adam. Do you know anything about gravity?
18
Gravity of Isaac Newton, the scientist? When the apple fell from the tree?
19
Yes, Adam. Gravity always pulls objects toward Earth.


20
Let me ask you first, what happens when the girl stops pedaling
21
I think the bike will slow down until it stops.
22
Genius, this happens due to friction force
23
Now I understand.
Next Day
24
That's enough, let's go home, please.
25
I want to stay; I have a lot of energy today.


2
Projects
1 The Sinai Blue Agama Lizard
2 Vehicle Safety

Project 1 Unit 1

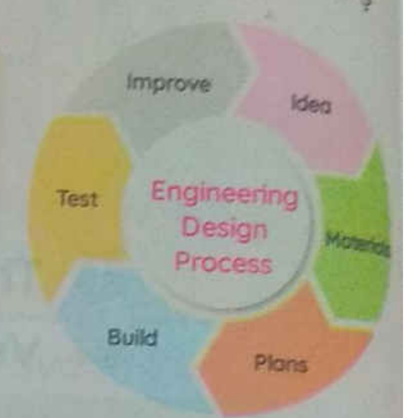
The Sinai Blue Agama Lizard

» In this interdisciplinary project, you will use your science and math skills to find a solution to a real-world problem.

في هذا المشروع متعدد التخصصات، ستستخدم مهاراتك في العلوم والرياضيات لإيجاد حل لمشكلة حقيقية في العالم.

The project challenges you to think about all of the members of a community and how humans affect other living organisms.

يساعدك هذا المشروع في التفكير في كل أفراد المجتمع وكيف تؤثر أنشطة الإنسان على الكائنات الحية الأخرى.



In this story, you will read about a population of the blue Sinai agama lizard who have been impacted by a new sidewalk. You will learn more about the habitat and needs of the agama, and then you will design a solution to help them survive.

في تلك القصة، سوف تعلم أن أعداد سحالي سيناء الزرقاء تأثرت بإنشاء طريق جديد.
سوف تتعلم المزيد عن موطن واحتياجات سحالي سيناء وبعد ذلك سوف تصمم حلًا لمساعدتها على البقاء.

Maher, Laila, and Galal are looking for the Sinai agama lizards that they usually see on their walk home from school.

Laila asks: I can't find any. Where'd they all go?
Maher says: Professor Hassan said there were lots of them here.

They keep searching, but don't find any lizards. As they grow tired of looking.

Laila says: I wonder why we can't find them. I think we need to ask Professor Hassan.

Maher and Galal smile as all three start to run down the sidewalk to her house. The friends talk over each other as they explain the problem to Professor Hassan.

Laila says: There were plenty of Sinai agamas in that area before they built the new, wider sidewalk.
Galal asks: Why don't we get rid of the sidewalk and see if they come back?
Laila says: The sidewalk helps everyone to be safe. Now we can walk and ride bikes and scooters to school and other places.
Professor Hassan says: The path is a good thing, but we need to find out more about Sinai agama and why you couldn't find any there.

Problem

- Finding a solution to design a sidewalk that meets the humans needs and helps them to return the Sinai blue agama lizards to their homeland.

إيجاد حل لتصميم ممشى يلبي احتياجات الإنسان ويساعده في عودة سحالي سيناء (العجمة الزرقاء) إلى موطنها.





Materials List (per group)

1. Building materials, such as craft sticks or small pieces of wood.
   مواد البناء (مثل العصي أو القطع الخشبية).
2. Construction paper or cardboard
   ورق مقوى أو ورق كرتون
3. Pebbles, small rocks, and/or clay
   حصى - صخور صغيرة أو صلصال
4. Sand, small sticks and leaves
   رمل، العصي الصغيرة ، أوراق أشجار
5. Toy animals
   ألعاب على شكل حيوانات
6. Blank paper or poster board
   ورق فارغ أو لوح ملصقات

Follow these steps with your teammates:

1. **Review the Challenge:** Study the requirements from the school and the needs of the Sinai agama.
2. **Assign Group Roles:** Decide the roles for the members of your group and record the names next to each role.
3. **Sketch Ideas:** After brainstorming, as a team, select three or four ideas to plan out in the Sketching Our Design boxes. Review your sketches and decide on one design to fully develop. Add more details to make it your blueprint that you will use to help you create your solution.
4. **Plan and Build:** Gather materials and begin building your prototype. Make sure to keep track of your steps and process.
5. **Reflect and Present:** When finished, review your product and your process. Identify ways you could improve. Prepare to share with your class.

اتبع هذه الخطوات مع زملائك في الفريق:

1. **استعرض التحدي:** ادرس متطلبات المدرسة واحتياجات سحلية العجمة بسيناء.
2. **توزيع الأدوار:** حدد الأدوار لأعضاء مجموعتك وسجل الأسماء بجوار كل دور.
3. **تخطيط الأفكار:** بعد العصف الذهني حدد ثلاثة أو أربعة أفكار لرسم مخطط لها في مربعات التخطيط ثم راجع الرسومات التخطيطية الخاصة بك وحدد تصميمًا واحدًا لتطويره بالكامل.
   ثم أضف المزيد من التفاصيل للتصميم لتجعله النموذج النهائي الذي ستستخدمه للوصول إلى حل المشكلة.
4. **ابتكار نموذج أولي:** تأكد من تنفيذ العملية بشكل صحيح لبناء النموذج الأولي.
5. **التأمل والعرض:** عند الانتهاء، قم بمراجعة المنتج والعملية التي قمت بها. حدد الطرق التي يمكنك تحسينها. استعد للمشاركة مع زملائك في الفصل.

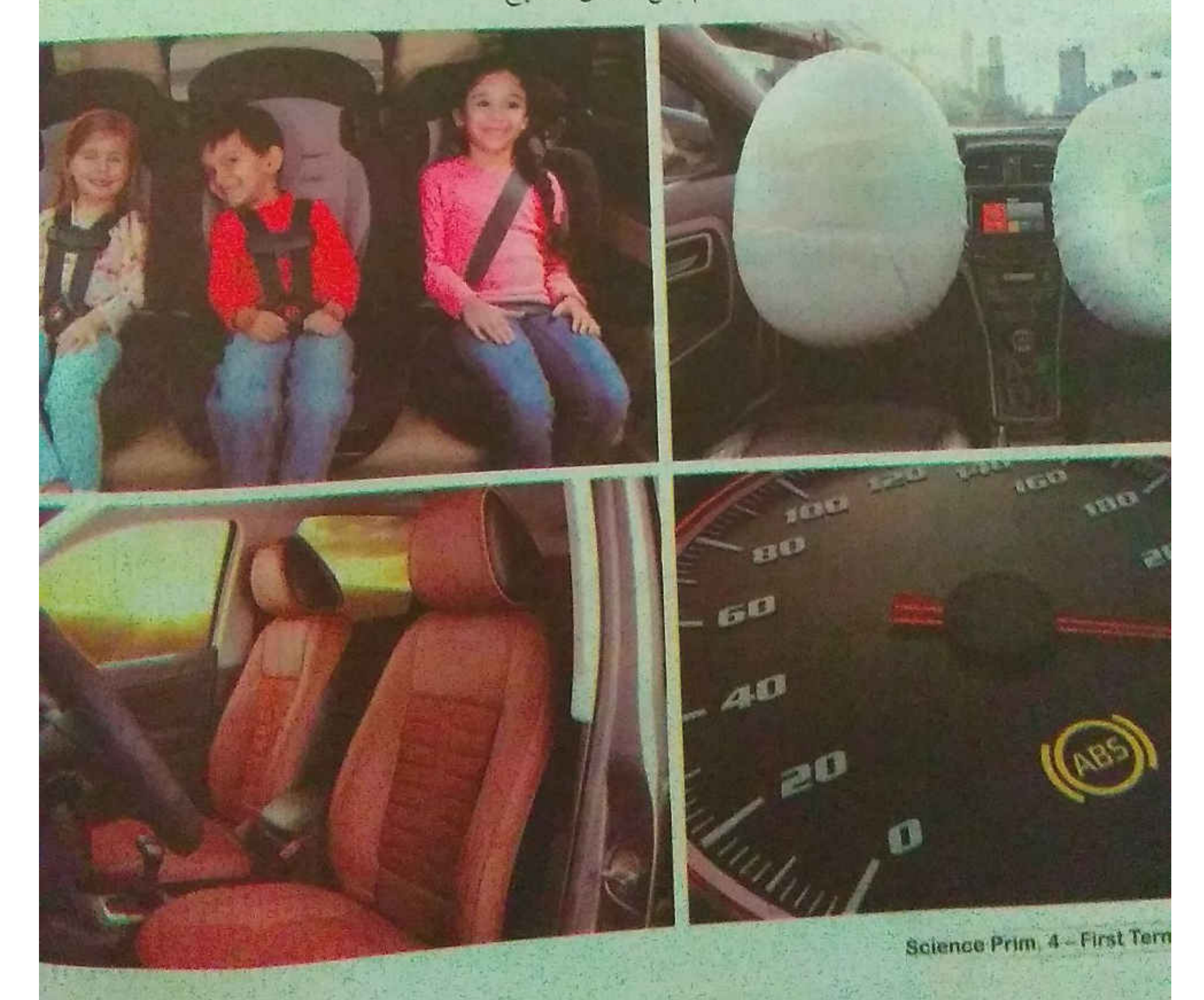
Project 1 Unit 2
Vehicle Safety

Introduction

- Car makers design vehicles for safety using modern technology.
يصمم صانعو السيارات المركبات بما يوفر أقصى درجات السلامة بالاستعانة بالتكنولوجيا الحديثة.
- Car makers are always looking for new ways to keep drivers and passengers safe.
يبحث صانعو السيارات دائمًا عن وسائل جديدة للحفاظ على سلامة السائقين والركاب.

Examples of Safety Equipment in Cars

- Seatbelts, airbags, head restraints and ABS.
حزام الأمان والوسائد الهوائية ومساند الرأس ونظام منع انغلاق المكابح.



Airbags

1 Importance: (Advantages)

- Although seatbelts are used to keep the person in place, sometimes they are not enough. Therefore, airbags are designed to protect passengers so that they do not crash into the body of the car or fly forward outside the vehicle during a collision.

بالرغم أن أحزمة الأمان تستخدم لتثبيت الراكب في مكانه فلا يصطدم بعجلة القيادة أثناء التصادم لكنها في بعض الأحيان غير كافية ولذلك صممت الوسائد الهوائية لحماية الركاب حتى لا يصطدموا بجسم السيارة الصلب أو يطيروا إلى الأمام خارج المركبة.

2 Disadvantages:

- Sometimes they can cause severe injuries to the face or chest
- There may be a sensor malfunction that may lead to the airbag being released at an inappropriate time, such as passing over a sudden bump or not opening the airbag in a collision.

قد تتسبب في بعض الأحيان في حدوث إصابات بالغة بالوجه أو الصدر.

قد يوجد هناك عطل في المستشعر مما يؤدي لإطلاق الوسادة الهوائية في وقت غير مناسب مثل المرور فوق مطب مفاجئ أو عدم فتح الوسادة عند حدوث التصادم.

3 Improvement:

- The design is simplified and the weight of its components is reduced, making it more flexible and efficient

تم تبسيط التصميم وتقليل وزن مكوناتها مما يجعلها أكثر مرونة وكفاءة.

4 Results:

- It is impossible to design cars that are safe in all types of collision situations, but car makers looking to develop car protection equipment.

لا يوجد تصميم للسيارة آمن في جميع حالات التصادم ومع ذلك يبحث صانعو السيارات تطوير وسائل حماية السيارات





» You have learned about airbags and how they keep people safe.

» Now, conduct research online about the latest safety feature other than airbags, such as:

- Blind Spot Monitoring System
- Driver Override Technology
- Night Vision System
- Traffic Sign Recognition System

« لقد تعلمت عن الوسائد الهوائية وكيف تحافظ على سلامة الركاب.

« الآن، قم بإجراء بحث عبر الإنترنت حول أحدث ميزات الأمان بخلاف الوسائد الهوائية، مثل: نظام مراقبة النقط العمياء - تكنولوجيا تجاوز السائق - نظام الرؤية الليلية - نظام التعرف على إشارات المرور.

Your research must include the following:

1. A plan to develop this mechanism.
2. Describe the impact of the collision on the activation of the device system.
3. Who benefits most from the protection mechanism?
4. How to develop this mechanism?

يجب مراعاة أن يشتمل البحث على الآتي:

1. خطة لتطوير تلك الآلية.
2. وصف تأثير التصادم في تفعيل نظام الجهاز.
3. من المستفيد الأكبر من آلية الحماية؟
4. كيفية تطوير تلك الآلية؟

3 Performance Tasks

General Instructions

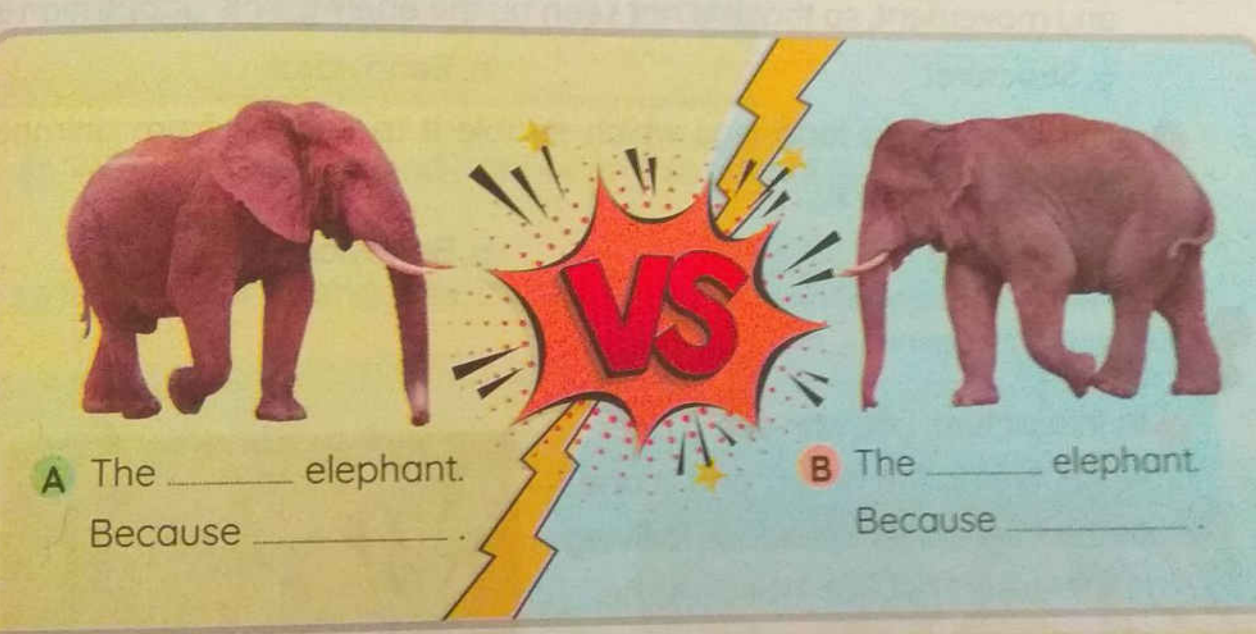
- The tasks are to be distributed, administered and assessed in two successive classes (one period).
- The teacher is to distribute the tasks and explain what to do in each task.
- Students can use the student's book.



1 African and Asian Elephants

» For most of us, most elephants are similar to each other; so, humans can't differentiate between them. This is different for scientists. There are two main types of elephants: the African elephant and the Asian elephant.

» If you know that the African elephant can live in hot temperature environments, but the Asian elephant can live in mild temperature environments, which one of these is the African elephant and which one is the Asian elephant? Why?



» Nowadays, wildlife experts agree that the elephants are in danger as a result of the destruction of their natural homes to be used for farming or to construct buildings, as well as being hunted by hunters to get their tusks for ivory trade.

Write some suggestions for protecting the elephants from the effects of human activities. Use these guiding words:

» Stating laws to prevent ________

» Stopping from ________

2 Where Does It Live?

A



Observe this picture.

1. Predict where this animal with big ears lives:
   (a) In a hot desert habitat.
   (b) In a cold polar environment.
2. What is your evidence for that?

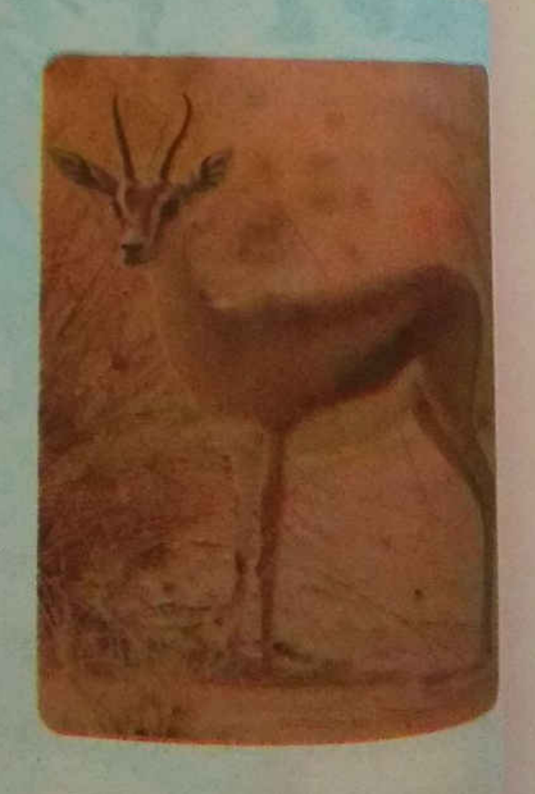
....

3. When this animal sees its enemy from other animals, it stands without any movement, so that it is not seen by the enemy. This adaptation is:
   a. Structural b. Behavioral
4. This animal has long legs which enable it to escape from animals. This adaptation is:
   a. Structural b. Behavioral



B

In this picture, you can see a deer which lives in the desert and is one of the animals which adapt to living in the desert habitat. Observe the picture and determine:



1. The kind of adaptation which enables it to run very fast:
   a. Structural b. Behavioral
2. This deer is active at night to get food and avoid enemies. This adaptation is:
   a. Structural b. Behavioral

3 Can the Polar Bear Live in Hot Habitat?



1. You studied that the polar bear adapts to live in very cold habitats. Why can't the polar bear live in the hot desert?

____
____
____
____
____

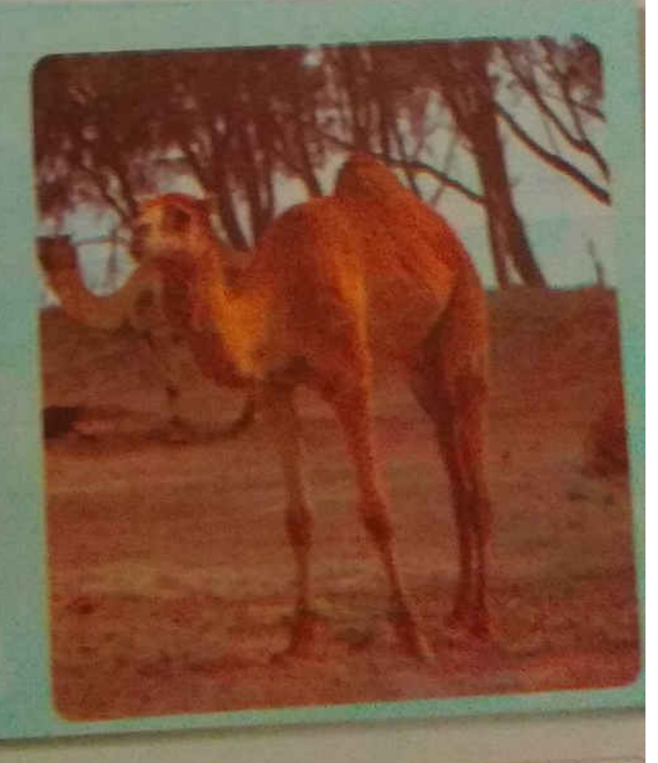
2. What changes should happen to this animal to be able to live in the hot desert?

» Its fur color changes to _______________

3. Think and predict: if the polar bear moves to live in the camel's desert habitat, will its life continue?

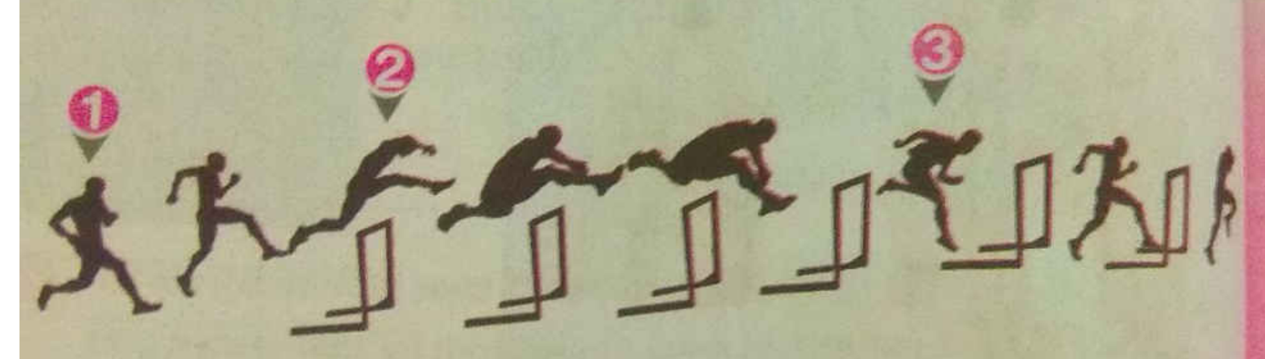
a. Yes

b. No



4 A Sports Competition

ou can see a sports competition. What can you observe in the energy transfer (potential energy- kinetic energy) when the player crosses the obstacles?



From this figure, determine the type of energy across the stages in which the player crosses the obstacles

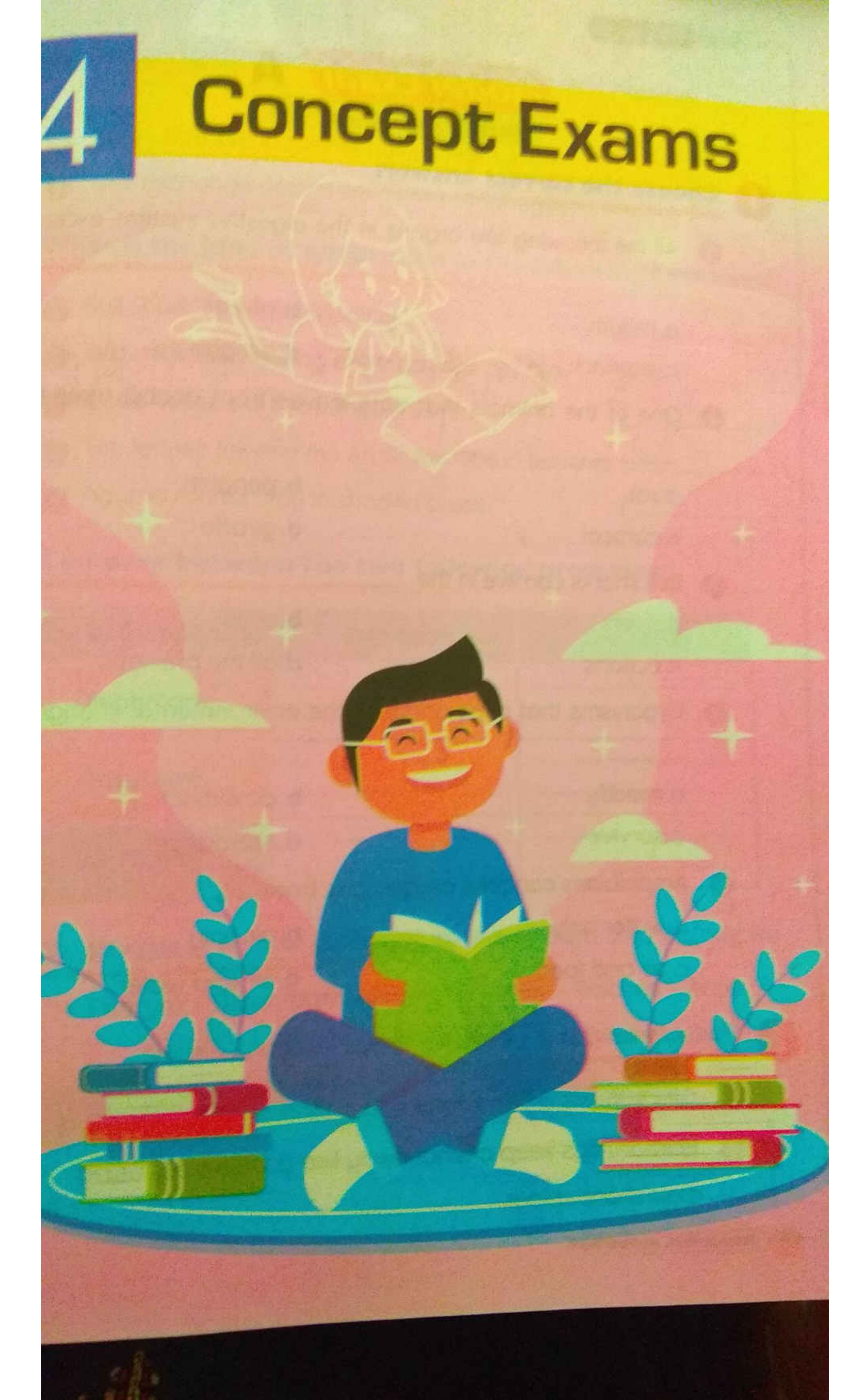
Position	Acquired Energy
Position 1	....
Position 2	....
Position 3	....

which position is there the greatest potential energy?

....

which position is there the greatest kinetic energy?

....


4
Concept Exams



Unit (1) Concept (1)

1 **Choose the correct answer:**

1. The acacia tree sends ________ messages when a giraffe starts to eat its leaves.
   a. impulses   b. smelly
   c. watery   d. air
2. Fish use their ________ to extract oxygen from water.
   a. tails   b. lungs
   c. gills   d. eyes
3. The organ that moves the food into the stomach is the ________
   a. tongue   b. esophagus
   c. trachea   d. liver
4. Carbon dioxide gas is ejected out of the body through ________
   a. inhalation   b. exhalation
   c. digestion   d. reproduction
5. The fur of a fennec fox protects it from ________ .
   a. wind   b. rain
   c. hot weather   d. cold weather

Put (✓) or (✗):

1. The palm tree has tiny leaves like the water lily plant. (
2. Camels' humps store fats to adapt to the extreme hot climat
   (
3. A penguin has scales to help it keep its body warm. (
4. Acacia trees and kapok trees have the same umbrella shap
   (
5. Humans can help in restoring the ecosystem by decreasing the number of trees. (

3 Label the following figure:

1. ....
2. ....
3. ....
4. ....
5. ....
6. ....
7. ....

4 Choose from column (A) what suits it in both columns (B) & (C):

Column (A)	Column (B)	Column (C)
1 Humans	a. live in water or on land.	a. have gills.
2 Fish	b. live on land.	b. have sensitive skin and lungs.
3 Amphibians	c. live in water.	c. have lungs.

1 .... 2 .... 3 ....



Unit (1) Concept (2)

Choose the correct answer:

1. ________ use echolocation to survive in dark water.
   - a. Bats
   - b. Bull sharks
   - c. Fennec foxes
   - d. Dolphins
2. When a jerboa hears the sound of a moving snake, it ________.
   - a. remains standing
   - b. jumps to hunt the snake
   - c. jumps to run away
   - d. hides in a burrow
3. The nervous system can do all the following functions, except ________.
   - a. gathering information about its surroundings
   - b. getting the energy needed from food
   - c. telling the body about what to do
   - d. keeping living organisms away from danger
4. The organ that processes the information is the ________.
   - a. nerve
   - b. spinal cord
   - c. sensory organ
   - d. brain
5. Bats use their ________ to get information about their surroundings in the dark.
   - a. noses
   - b. ears
   - c. eyes
   - d. skin

Put (✓) or (✗):

1. Dolphins use countershading to hunt in dark water. ( )
2. Pressing the brakes when you see a red traffic light is a visual response. ( )

3. Snakes can sense their prey through their sharp hearing sense. ( )
4. The visual response is slower than the auditory response. ( )
5. Some nocturnal animals have poor night vision, but they can still hunt at night. ( )

3 Arrange the following steps:

1. (……) Echo reflects back from the jellyfish.
2. (……) The sound waves transfer through water.
3. (……) A dolphin can detect the location of a jellyfish.
4. (……) The dolphin produces sound waves.
5. (……) Sound waves hit the body of the jellyfish

4 Choose from column (A) what suits in columns (B) & (C):

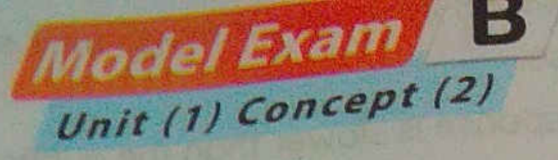
Column (A)	Column (B)	Column (C)
1 Jerboas	a. reptiles	a. have sharp sight and hearing senses.
2 Snakes	b. flying birds	b. can sense the heat of their prey.
3 Owls	c. flying mammals	c. use echo to hunt at night.
4 Bats	d. rodents	d. run in zigzag paths.

1 ……… . 2 ……… . 3 ……… . 4 ……… .

5 Classify the following words in this table:

Stomach - Brain - Nose - Spinal cord - Liver - Nerves - Alveoli - Lungs

Digestive System	Nervous System	Respiratory System
………	………	………
………	………	………



Unit (1) Concept (2)

1 Choose the correct answer:

1. The night active animals are called .... animals.
   a. predator
   b. prey
   c. nocturnal
   d. wild
2. Egyptian jerboa is considered a desert ....
   a. reptile
   b. rodent
   c. bird
   d. amphibian
3. Sensory receptors are nerves found near all of the following except the ....
   a. tongue
   b. ear
   c. nose
   d. brain
4. The response of a jerboa to jump quickly and escape takes ....
   a. one second
   b. two seconds
   c. less than one second
   d. more than one second
5. A snake can sense jerboas moving at night using a special part in its ....
   a. face
   b. nose
   c. eye
   d. tail

Put (✓) or (✗):

1. The jerboa is considered a rodent that has a sharp hearing sense. (
2. Reaction time always takes one second or more. (
3. As the reaction time decreases, the rodent can escape from vipers. (

4. Blinking your eyes when something comes near them is an auditory response. ( )
5. The brain is responsible for processing information after receiving it. ( )

Classify the following situations into visual response or auditory response:

1. Stopping the car when the traffic sign becomes red. (..........)
2. Escaping of jerboa when it hears the movement of a snake nearby. (..........)
3. Getting attention when your friend is waving to you.(..........)

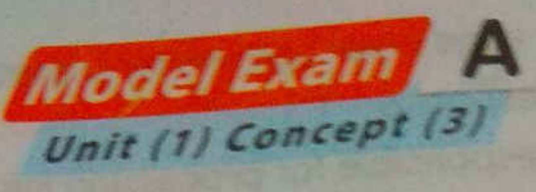
Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
Brain	a. connect all nervous system components together.
Spinal cord	b. are nerves found in the sensory organs that receive information.
Nerves	c. is located inside the backbone.
Sensory receptors	d. is the main control center of the body of living organism.

1 .... 2 .... 3 .... 4 ....

What is the kind of adaptation in the following examples?

1. Owls prefer to surprise their prey at night. (..........)
2. The jerboa can jump fast by its hind legs. (..........)
3. Dolphins use the echolocation property to locate their prey. (..........)



1 Choose the correct answer:

1. The reflected light from an object enters the eyes through ....
   a. eye sockets
   b. eye pupils
   c. eye lenses
   d. eye retina
2. The light waves travel in the air as .... lines.
   a. zigzag
   b. curved
   c. circular
   d. straight
3. The .... eyes glow in the dark.
   a. snake's
   b. jerboa's
   c. fishing cat's
   d. tarsier's
4. The sun is the main source of energy because it .... lig
   a. absorbs
   b. emits
   c. reflects
   d. transmits
5. Which of the following is a source of light?
   a. The mirror
   b. The moon
   c. The fire
   d. The eye

Put (✓) or (✗):

1. Tarsiers and owls can't move their eyes in their sockets. (
2. The moon is considered a natural source of light. (
3. Fishing cats have a mirror-like membrane in front of their ey (
4. It is much easier for humans to see objects in dim light. (
5. Tapetum lucidum is a life-saving structural adaptation. (

3 Classify the following words in this table:

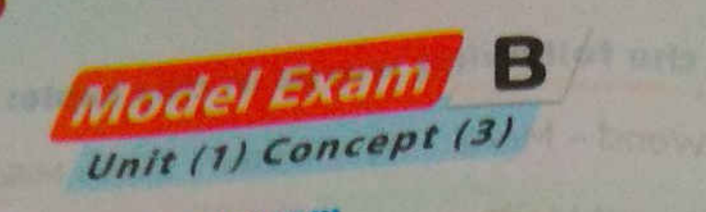
Wood - Metal - Pure water - Skin - Milk - Lenses

Transparent Mediums	Opaque Mediums
________	________
________	________

4 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Humans	a. are primate monkeys.
2 Owls & cats	b. are nocturnal animals that have poor night vision.
3 Tarsiers	c. are nocturnal animals that have excellent night vision.
4 Bats & Snakes	d. use night vision goggles to see in the dark.

1 ______ . 2 ______ . 3 ______ . 4 ______ .



1 Choose the correct answer:

1. The structural adaptation that helps fishing cats to hunt at n[illegible] is their ________ .
   - a. hearing sense
   - b. short ears
   - c. thick fur
   - d. tapetum lucidum
2. The humans' eyes allow light to pass trough their pupils ________ those of cats.
   - a. less than
   - b. more than
   - c. similar to
   - c. equal to
3. Humans use ________ to see in the dark.
   - a. medical glasses
   - b. night glasses
   - c. special lenses
   - d. night goggles
4. The ________ is like a computer in processing information.
   - a. eye
   - b. heart
   - c. brain
   - d. Spinal cord
5. All the following are transparent objects, except the ________
   - a. lens
   - b. paper
   - c. air
   - d. glass

'ut (✓) or (✗):

- All nocturnal animals have spectral night vision. (
- The kind of light reflection depends on the light source. (
- The pupils in humans eyes open narrower than those in the eyes of cats. (

4. Shiny objects include mirrors, metals and glass. ( )
5. The moon is considered a natural light source. ( )

3 Study the following figures, then complete:

Figure (1) | Figure (2) | Figure (3)

a. The pupils in figure (1) open ________ than the pupils in figure (3).

b. Figure (2) can move each eye ________.

c. Figure (____) can turn its head in all directions.

d. Figure (____) needs a night vision goggles to see in the dark.

4 Arrange the following steps that represent vision:

1. (____) The brain translates this signal.
2. (____) Light falls on objects.
3. (____) The eye pupils allow the light to enter the eyes.
4. (____) Light reflects on the eyes.
5. (____) The sensory receptors at the back of the eyes send a signal to the brain.





1 Choose the correct answer:

1. Humpback whales sing during .... months, which is the mating season.
   - a. winter
   - b. summer
   - c. autumn
   - d. spring
2. A rescue flare depends on .... sense.
   - a. hearing
   - b. sight
   - c. smell
   - d. touch
3. Light patterns in Morse code can be expressed in ....
   - a. symbols
   - b. beeps
   - c. flashes
   - d. numbers
4. Nurse ants send smelly messages to scout ants if ....
   - a. there is a danger nearby
   - b. the food is not enough
   - c. they find food
   - d. they want to attract a mate
5. Thumbs-down code means that ....
   - a. you are angry
   - b. you agree
   - c. you are saying yes
   - d. you are saying no

Put (✓) or (✗):

1. Displaying light inside the fireflies bodies is considered a behavioral adaptation. (
2. Morse code can be detected by the sight sense or hearing sense. (

3. Ants communicate together using motion patterns. ( )
4. Bats can't change echo into vibrations. ( )
5. Facial expression is a code that can be received by the eyes. ( )

Classify the following according to the method that the living organism uses to communicate:

Dolphins - Fireflies - Humpback whales - Honeybees - Humans - Bats

Morse Code	Echolocation	Light Show	Dancing	Singing
....	....	....	....	....

Arrange the following steps that represent vision:

1. (.....) These vibrations tell the person about nearby bodies.
2. (.....) Echo is turned into vibration.
3. (.....) A person can feel vibration using his/her thumb.
4. (.....) The cane picks up an echo.

Complete the sentences from the following words:

(alphabet letters - sight - Morse - hearing - information)

1. Codes transfer ....
2. Flashlight codes are indicated by .... and drum codes are indicated by ....
3. Dots and dashes represent ....
4. .... code is one of the communication systems for long distances.



Model Exam B

Unit (1) Concept (4)

1 Choose the correct answer:

1. Both bats and canes ________.
   a. produce low-pitched sounds
   b. produce high-pitched sounds
   c. change echo into vibrations
   d. can't change echo into vibrations

2. Ants use ________ sense to communicate together in case of the lack of food.
   a. hearing
   b. sight
   c. smell
   d. touch

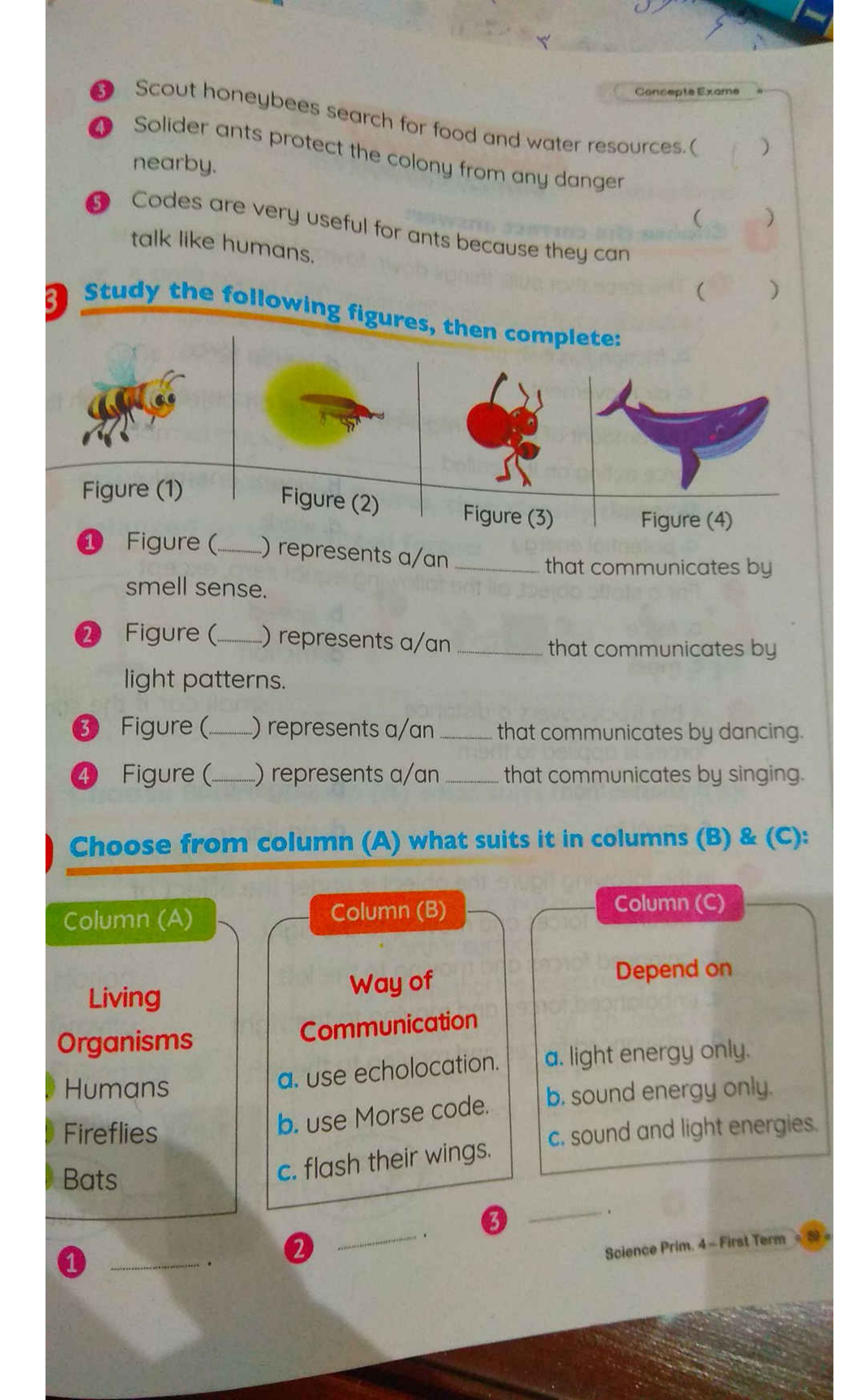
3. Fireflies communicate by light patterns to attract ________.
   a. a predator
   b. a prey
   c. an insect
   d. a mate

4. High-pitched sounds travel better in ________ water during the ________ season.
   a. warm - mating
   b. cold - mating
   c. warm - feeding
   d. cold - feeding

5. In Morse code, long flashes can be used instead of ________.
   a. dots
   b. dashes
   c. dots and dashes
   d. neither dots nor dashes

(✓) or (✗):

1. Without the strong sense of hearing, bats will die. ( )
2. Morse code is used by humans to communicate across long distances. ( )



3. Scout honeybees search for food and water resources. (   )
4. Solider ants protect the colony from any danger nearby. (   )
5. Codes are very useful for ants because they can talk like humans. (   )

3 Study the following figures, then complete:

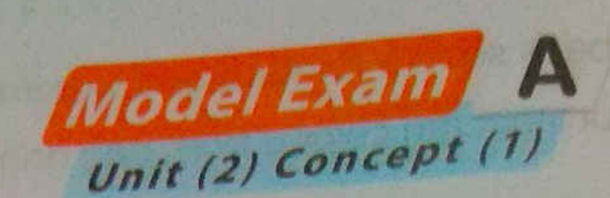
Figure (1)	Figure (2)	Figure (3)	Figure (4)

1. Figure (......) represents a/an .... that communicates by smell sense.
2. Figure (......) represents a/an .... that communicates by light patterns.
3. Figure (......) represents a/an .... that communicates by dancing.
4. Figure (......) represents a/an .... that communicates by singing.

Choose from column (A) what suits it in columns (B) & (C):

Column (A) Living Organisms	Column (B) Way of Communication	Column (C) Depend on
Humans	a. use echolocation.	a. light energy only.
Fireflies	b. use Morse code.	b. sound energy only.
Bats	c. flash their wings.	c. sound and light energies.

1. ....
2. ....
3. ....



Choose the correct answer:

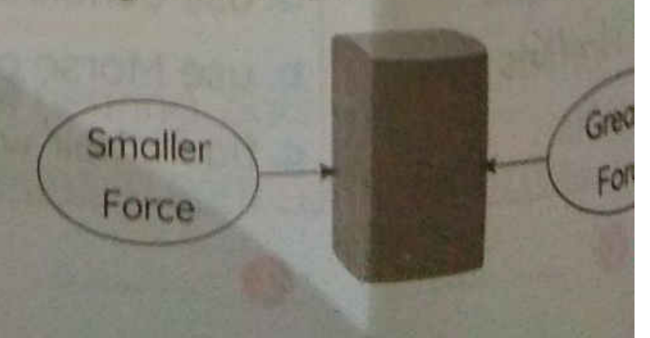
1. The force that pulls things down toward Earth's center is ....
   - a. friction force
   - b. gravity
   - c. air movement
   - d. inertia force

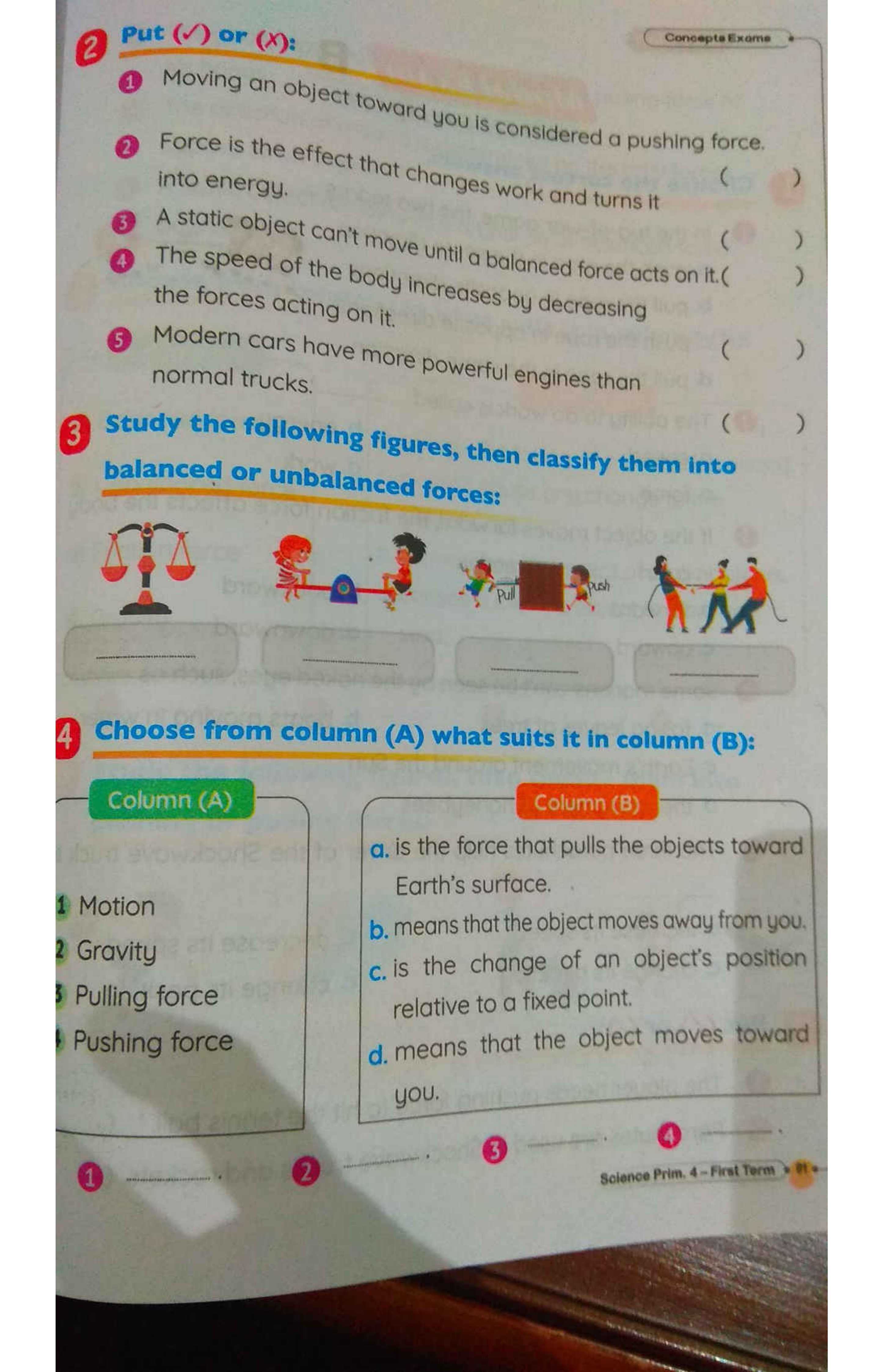
2. The amount of energy required to move an object through the force acting on it is called ....
   - a. speed
   - b. kinetic energy
   - c. potential energy
   - d. work

3. For a static object, all the following equal zero, except ....
   - a. force
   - b. speed
   - c. mass
   - d. friction

4. A big truck covers a distance .... a small car if the same forces is applied to them.
   - a. shorter than
   - b. longer than
   - c. equal to
   - d. similar to

5. In the following figure, the object is under the effect of ....
   - a. balanced forces and moving to the right
   - b. balanced forces and moving to the left
   - c. unbalanced forces and moving to the right
   - d. unbalanced forces and moving to the left





2 Put (✓) or (✗):

1. Moving an object toward you is considered a pushing force. ( )
2. Force is the effect that changes work and turns it into energy. ( )
3. A static object can't move until a balanced force acts on it. ( )
4. The speed of the body increases by decreasing the forces acting on it. ( )
5. Modern cars have more powerful engines than normal trucks. ( )

3 Study the following figures, then classify them into balanced or unbalanced forces:

....

4 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Motion	a. is the force that pulls the objects toward Earth's surface.
2 Gravity	b. means that the object moves away from you.
3 Pulling force	c. is the change of an object's position relative to a fixed point.
4 Pushing force	d. means that the object moves toward you.

1 .... 2 .... 3 .... 4 ....

Model Exam B

Unit (2) Concept (1)

1 Choose the correct answer:

1. In the tug-of-war game, the two teams ________ .
   a. push the rope in the same direction
   b. pull the rope in opposite directions
   c. push the rope in opposite directions
   d. pull the rope in the same direction

2. The ability to do work is called ________ .
   a. speed
   b. energy
   c. force
   d. work

3. If the object moves forward, the friction force affects the bo[dy]
   in a/an ________ direction .
   a. forward
   b. backward
   c. upward
   d. downward

4. Some motions can't be seen by the naked eyes, such as ________
   a. falling leaves of trees
   b. boats moving in water
   c. Earth's movement around the Sun
   d. the movement of honeybees

5. The three parachutes help the driver of the Shockwave truck t[o]
   ________ .
   a. increase its speed
   b. decrease its speed
   c. change its direction
   d. change its position

Put (✓) or (✗):

1. The player needs pushing force to hit the tennis ball. (
2. Parachutes are used in Shockwave trucks and rockets. (

3. The goalkeeper catches the ball using the pulling force of his hands. ( )
4. The direction of motion is determined by the total forces applied to an object. ( )
5. A static object remains as it is until an unbalanced force acts on it. ( )

3 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Balanced force	a. causes the falling of objects downward.
2 Unbalanced force	b. doesn't cause any change to the object's state.
3 Friction force	c. causes the movement of static objects.
4 Gravity	d. causes a moving object to slow and stop.

1 .... 2 .... 3 .... 4 ....

4 Study the following figures, then classify them into pushing or pulling forces:

....

Model Exam A

Unit (2) Concept (2)

1 Choose the correct answer:

1. The potential energy of a roller coaster decreases gradu[ally] during _______ .
   - a. moving up
   - b. sliding down
   - c. stopping suddenly
   - d. changing its direction

2. All of these objects have energy, except _______ .
   - a. a truck moving on a flat road
   - b. a static toy car on a ta[ble]
   - c. a basketball moving in the air
   - d. a static ball on the grou[nd]

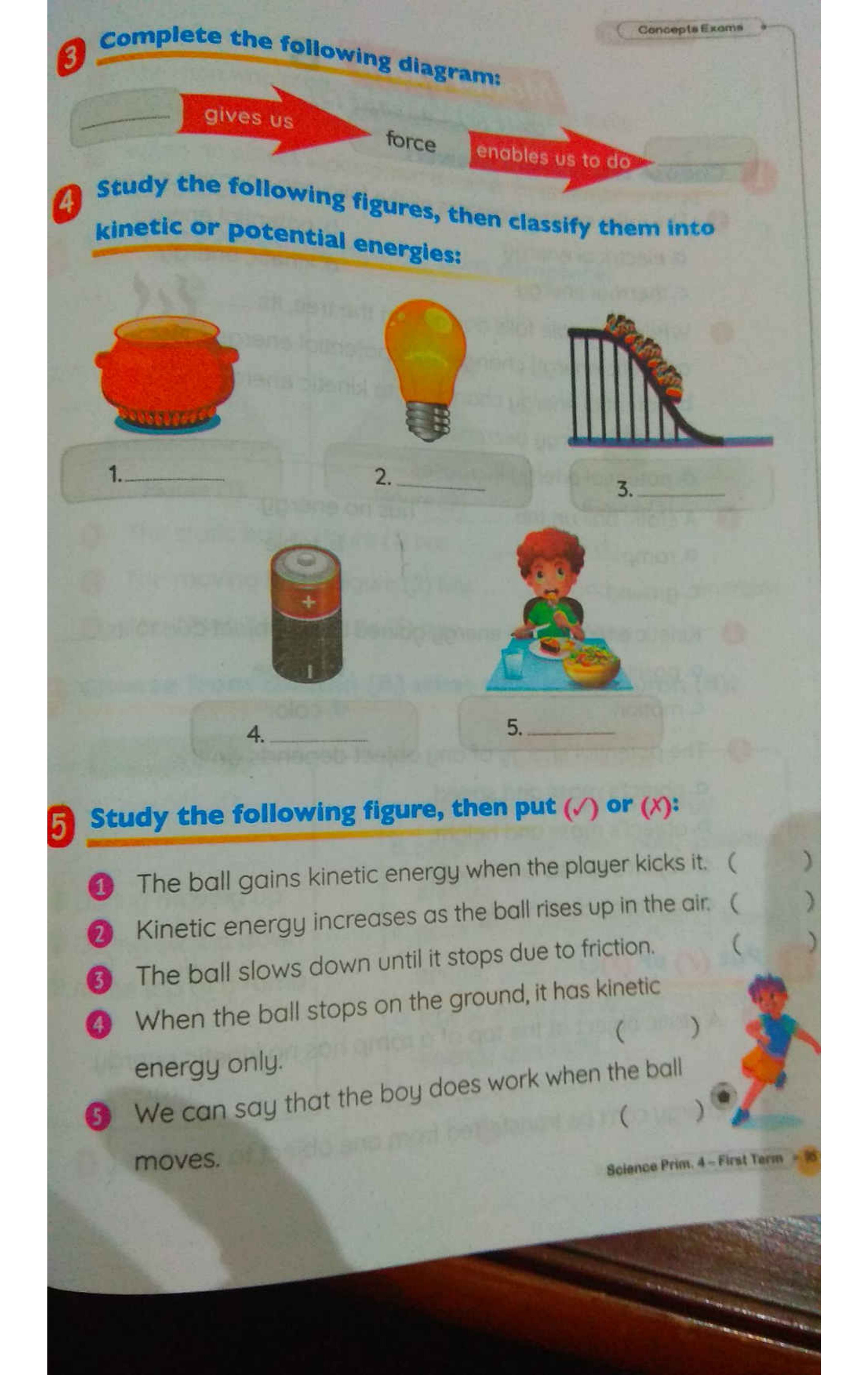
3. _______ is the energy that can be seen by the eyes.
   - a. Electrical energy
   - b. Sound energy
   - c. Thermal energy
   - d. Light energy

4. When an acrobat player jumps down, his _______ increases
   - a. speed
   - b. height
   - c. mass
   - d. potential energy

5. Scientists classify all kinds of energy into _______ energy an[d] _______ energy.
   - a. sound - light
   - b. thermal - electrical
   - c. potential - kinetic
   - d. chemical - gravitationa[l]

Put (✓) or (✗):

1. All forms of energy can be classified into two types. (
2. Force gives us work that enables us to do energy. (
3. The speed of a roller coaster decreases as it moves down the ramp. (
4. A falling object has both kinetic and potential energies. (
5. When you kick a ball, kinetic energy is produced. (



3 Complete the following diagram:

______ gives us → force → enables us to do → ______

4 Study the following figures, then classify them into kinetic or potential energies:

1. ______
2. ______
3. ______
4. ______
5. ______

5 Study the following figure, then put (✓) or (✗):

1. The ball gains kinetic energy when the player kicks it. (   )
2. Kinetic energy increases as the ball rises up in the air. (   )
3. The ball slows down until it stops due to friction. (   )
4. When the ball stops on the ground, it has kinetic energy only. (   )
5. We can say that the boy does work when the ball moves. (   )

Model Exam B

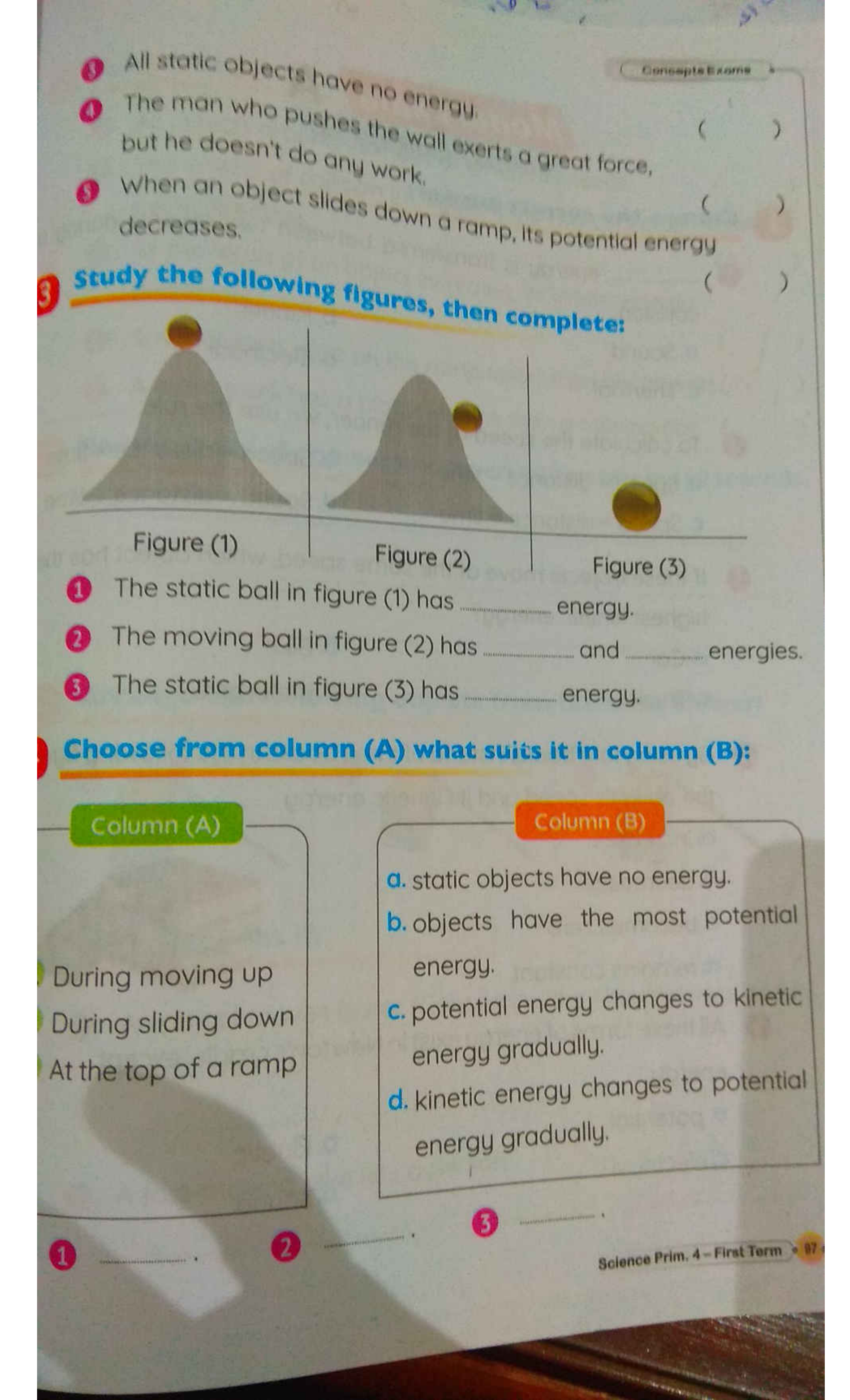
Unit (2) Concept (2)

1 Choose the correct answer:

1. The roller coaster contains all the following energies, except
   - a. electrical energy
   - b. potential energy
   - c. thermal energy
   - d. kinetic energy
2. When an apple falls down from the tree, its ....
   - a. kinetic energy changes into potential energy
   - b. potential energy changes into kinetic energy
   - c. kinetic energy decreases
   - d. potential energy increases
3. A static ball on the .... has no energy.
   - a. ramp
   - b. table
   - c. ground
   - d. chair
4. Kinetic energy is the energy gained by an object due to its ....
   - a. position
   - b. shape
   - c. motion
   - d. color
5. The potential energy of any object depends on the ....
   - a. object's mass and speed
   - b. object's mass and height
   - c. object's speed and height
   - d. object's position only

Put (✓) or (✗):

1. A static object at the top of a ramp has no kinetic energy. (
2. Energy can't be transferred from one object to another. (



3. All static objects have no energy. ( )
4. The man who pushes the wall exerts a great force, but he doesn't do any work. ( )
5. When an object slides down a ramp, its potential energy decreases. ( )

3 Study the following figures, then complete:

Figure (1) Figure (2) Figure (3)

1. The static ball in figure (1) has .... energy.
2. The moving ball in figure (2) has .... and .... energies.
3. The static ball in figure (3) has .... energy.

Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
During moving up	a. static objects have no energy.
During sliding down	b. objects have the most potential energy.
At the top of a ramp	c. potential energy changes to kinetic energy gradually.
	d. kinetic energy changes to potential energy gradually.

1 .... 2 .... 3 ....

Model Exam A

Unit (2) Concept (3)

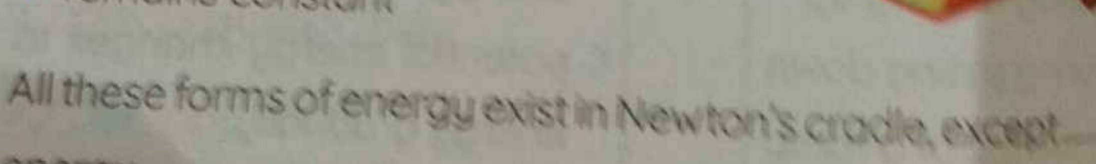
1 Choose the correct answer:

1. ______ energy is transferred between two objects du collision.
   a. Sound
   b. Kinetic
   c. Thermal
   d. Electrical

2. To calculate the speed of the runner, we use the rule:
   a. Speed = distance − time
   b. Speed = distance × tim
   c. Speed = distance + time
   d. Speed = distance ÷ tim

3. If these objects move at the same speed, which object has t highest kinetic energy?
   a. Car
   b. Bike
   c. Truck
   d. Motorbike

4. By using four books instead of three books in the following fig the object's speed and its kinetic energy ______.
   a. increases
   b. decreases
   c. becomes zero
   d. remains constant



5. All these forms of energy exist in Newton's cradle, except ______ energy.
   a. potential
   b. kinetic
   c. electrical
   d. sound

Put (✓) or (✗):

1. All objects around us move at different speeds. ( )
2. The effects of collision increases if the two cars crash in the same direction. ( )
3. As the mass of an object increases, its kinetic energy decreases. ( )
4. Small objects slide on the ramp faster than big objects. ( )
5. A static truck has a bigger engine than a moving car. ( )

Find the speed of a runner who covers 600 meters in 150 seconds.

....

....

....

Arrange the following objects from faster to slower:

1

2

3

What happens if:

1. An object moves faster. (Concerning the object's mass and its kinetic energy).

....

2. A fast-moving bike hits a person.

....



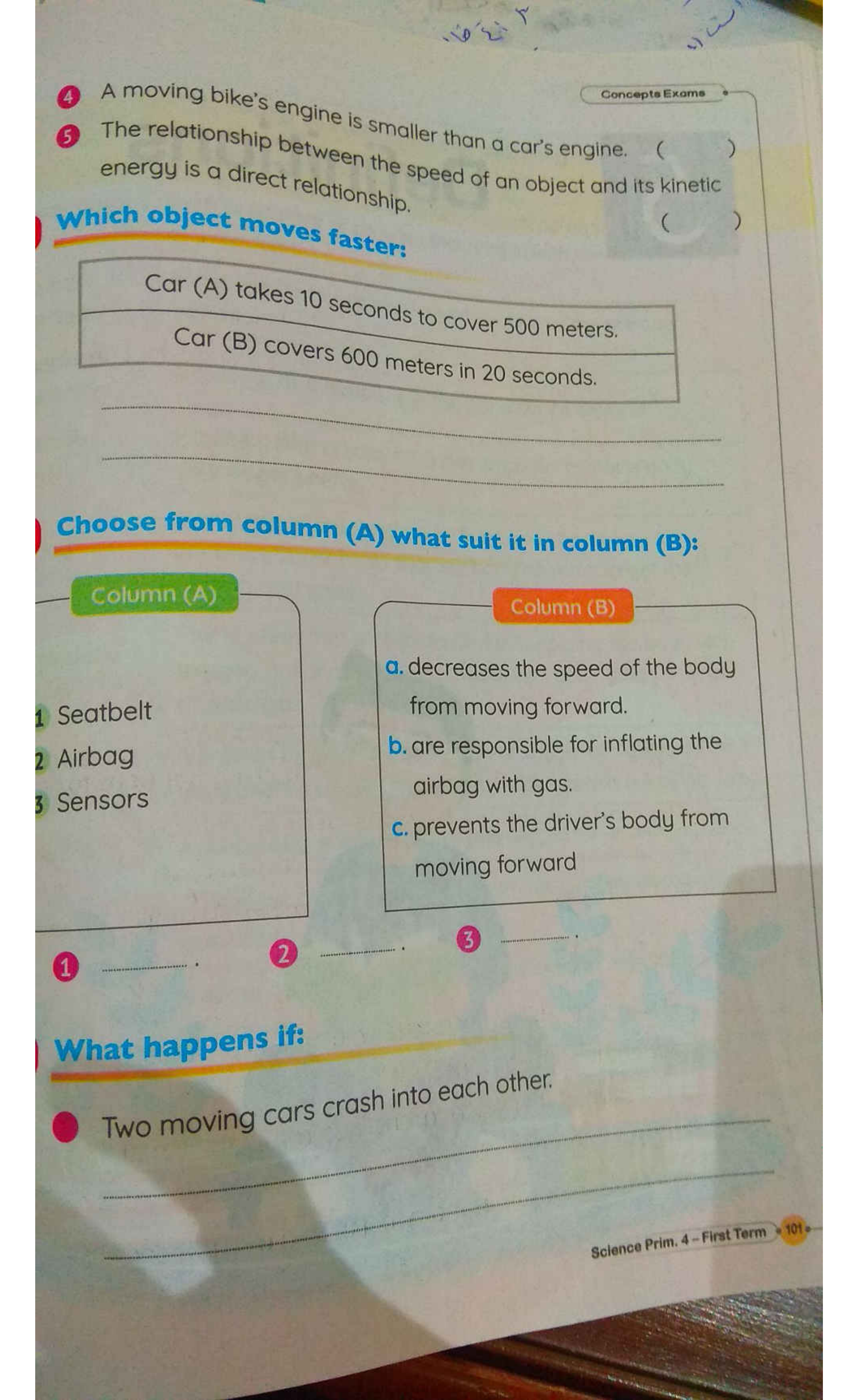
Unit (2) Concept (3)

1 Choose the correct answer:

1. All these kinds of energy exist during collision, except
   a. sound energy
   b. thermal energy
   c. electrical energy
   d. kinetic energy
2. Which of the following measurements doesn't affect an object's speed?
   a. Force
   b. Direction
   c. Distance
   d. Time
3. The car with a speed of ________ kilometers per hour consumes less fuel.
   a. zero
   b. 60
   c. 80
   d. 100
4. When a fast bike hits a woman in the street, ________.
   a. she will survive
   b. she may die
   c. her life is in danger
   d. nothing happens to her
5. The moving heavy ball becomes faster on the ________.
   a. flat road
   b. curved road
   c. straight road
   d. inclined ramp

Put (✓) or (✗):

1. The speed of a truck decreases when it takes longer time to cover the same distance. (
2. By increasing the angle of an inclined ramp, the kinetic energy decreases. (
3. A static truck consumes more fuel than a moving car. (



4. A moving bike's engine is smaller than a car's engine. ( )
5. The relationship between the speed of an object and its kinetic energy is a direct relationship. ( )

Which object moves faster:

Car (A) takes 10 seconds to cover 500 meters.
Car (B) covers 600 meters in 20 seconds.

....

....

Choose from column (A) what suit it in column (B):

Column (A)

1. Seatbelt
2. Airbag
3. Sensors

Column (B)

a. decreases the speed of the body from moving forward.
b. are responsible for inflating the airbag with gas.
c. prevents the driver's body from moving forward

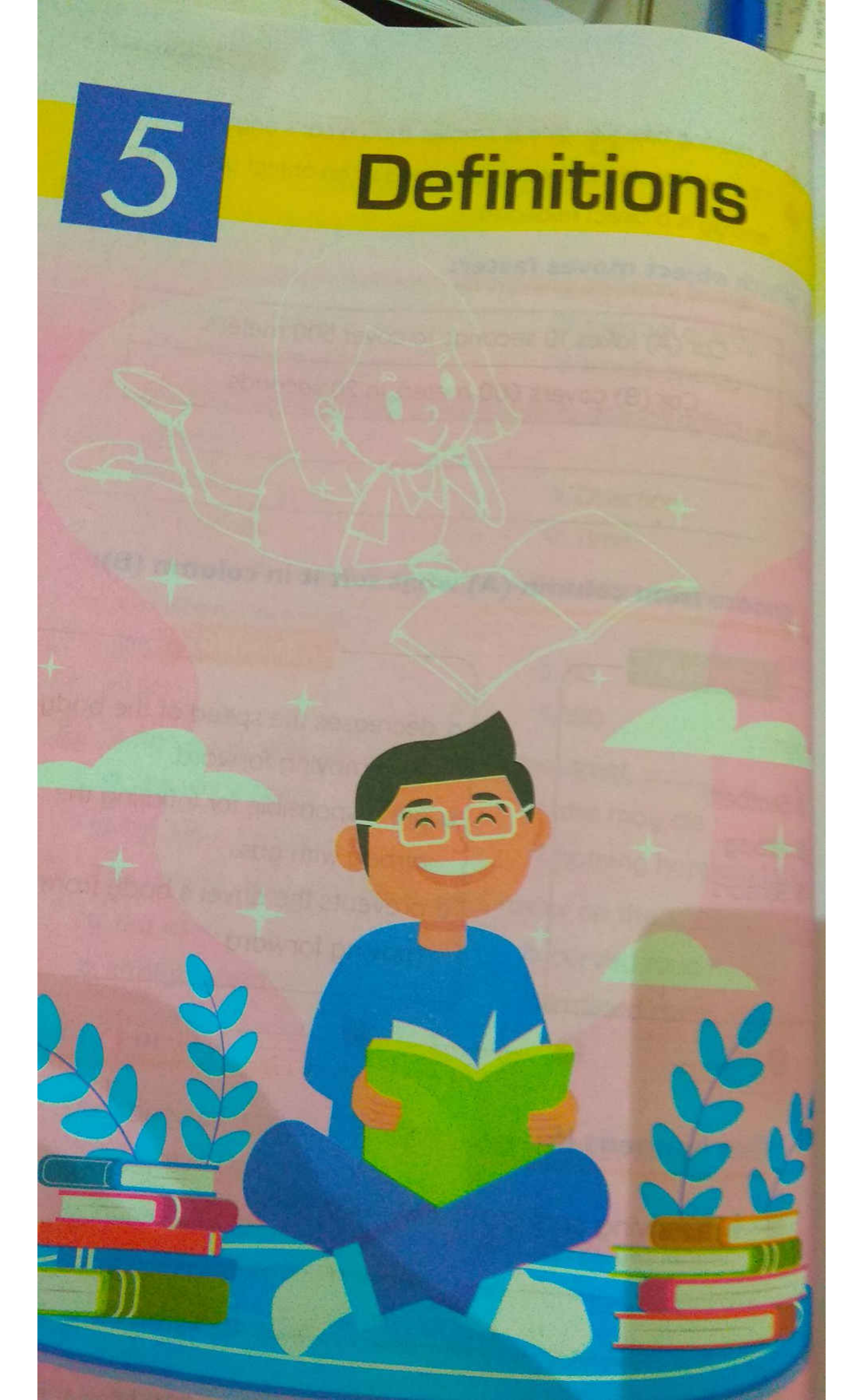
1 .... 2 .... 3 ....

What happens if:

- Two moving cars crash into each other.

....

....



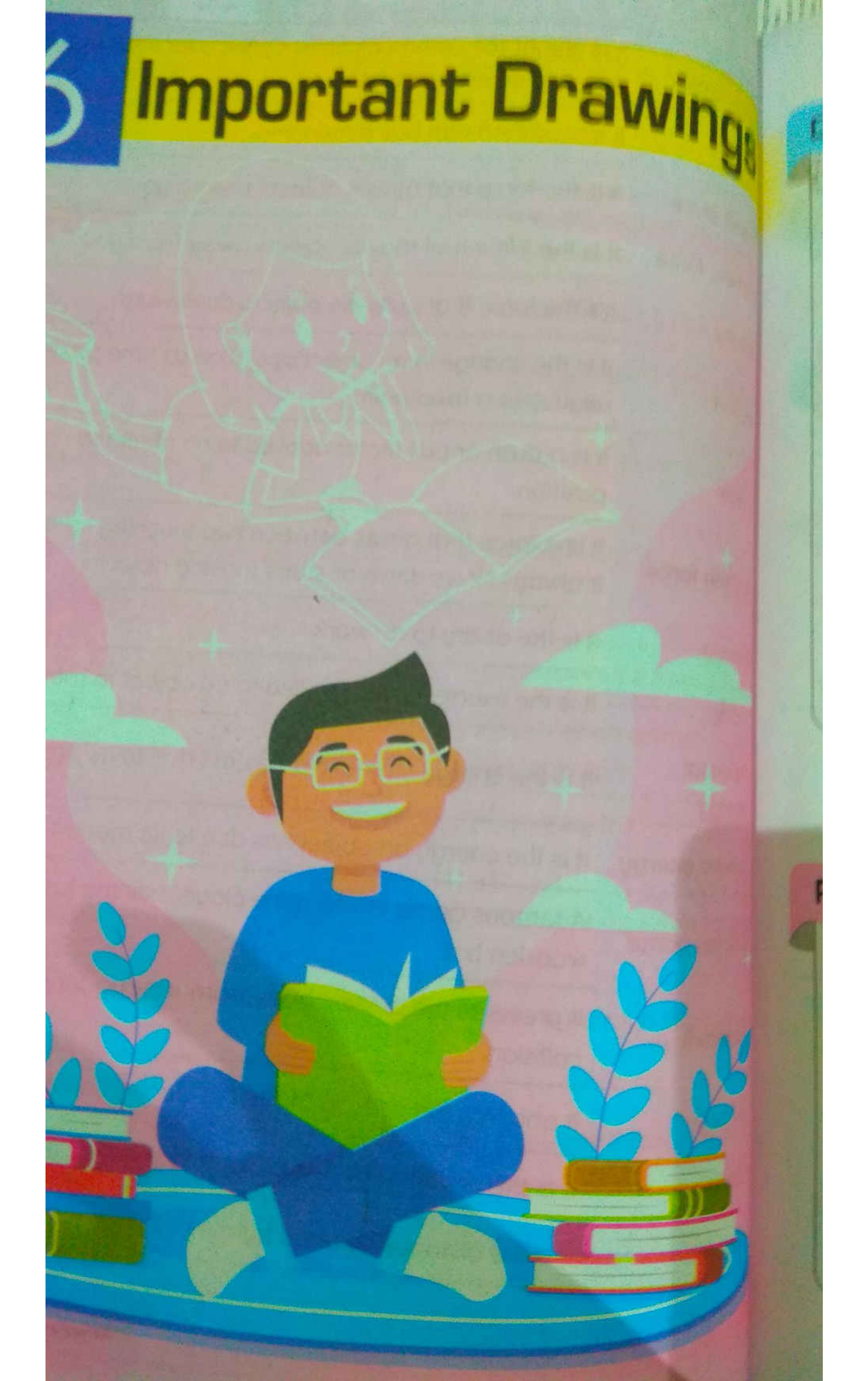
5 Definitions

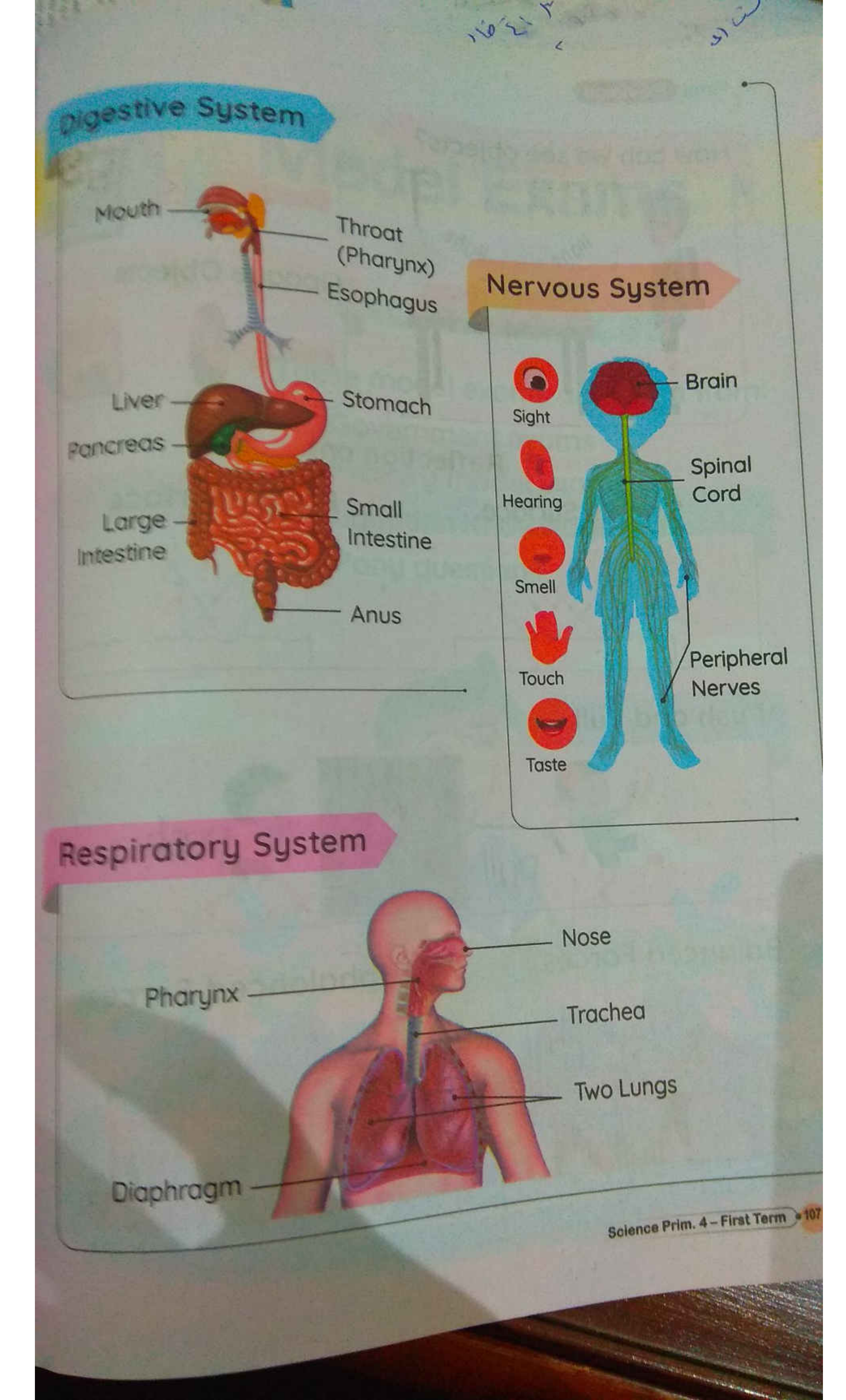
Term	Definition
Adaptations	They are the characteristics that help living organisms to survive and reproduce in their ecosystem.
Camouflage	It is an example of adaptation in which some animals hide from predators or prey by blending in with the surrounding environment.
Structural adaptation	A change that happens in the structure of the animals' bodies.
Behavioral adaptation	A change that happens in the behavior of animals.
Digestive system	A system that breaks food into small parts that a body uses to get energy.
Digestion process	A process of breaking down food and changing it to chemical substances that the body absorbs to get the energy and grow.
Respiratory system	The system that is responsible for supplying the body with oxygen gas that our bodies need and getting rid of carbon dioxide gas.
Respiration process	A process by which the air that carries oxygen gas goes into the body and the air carrying carbon dioxide gas gets out of the body.
Inhalation	A process by which the air carrying oxygen gas enters your body.
Exhalation	A process of getting rid of the air carrying carbon dioxide gas out of your body.
Diaphragm	A large muscle that directs inhalation and exhalation processes.
Natural changes	The changes done by nature to the environment. They are slow, so animals can adapt to these changes.
Human activities	The changes done by human activities to the environment. They are fast, so animals cannot adapt to these changes.

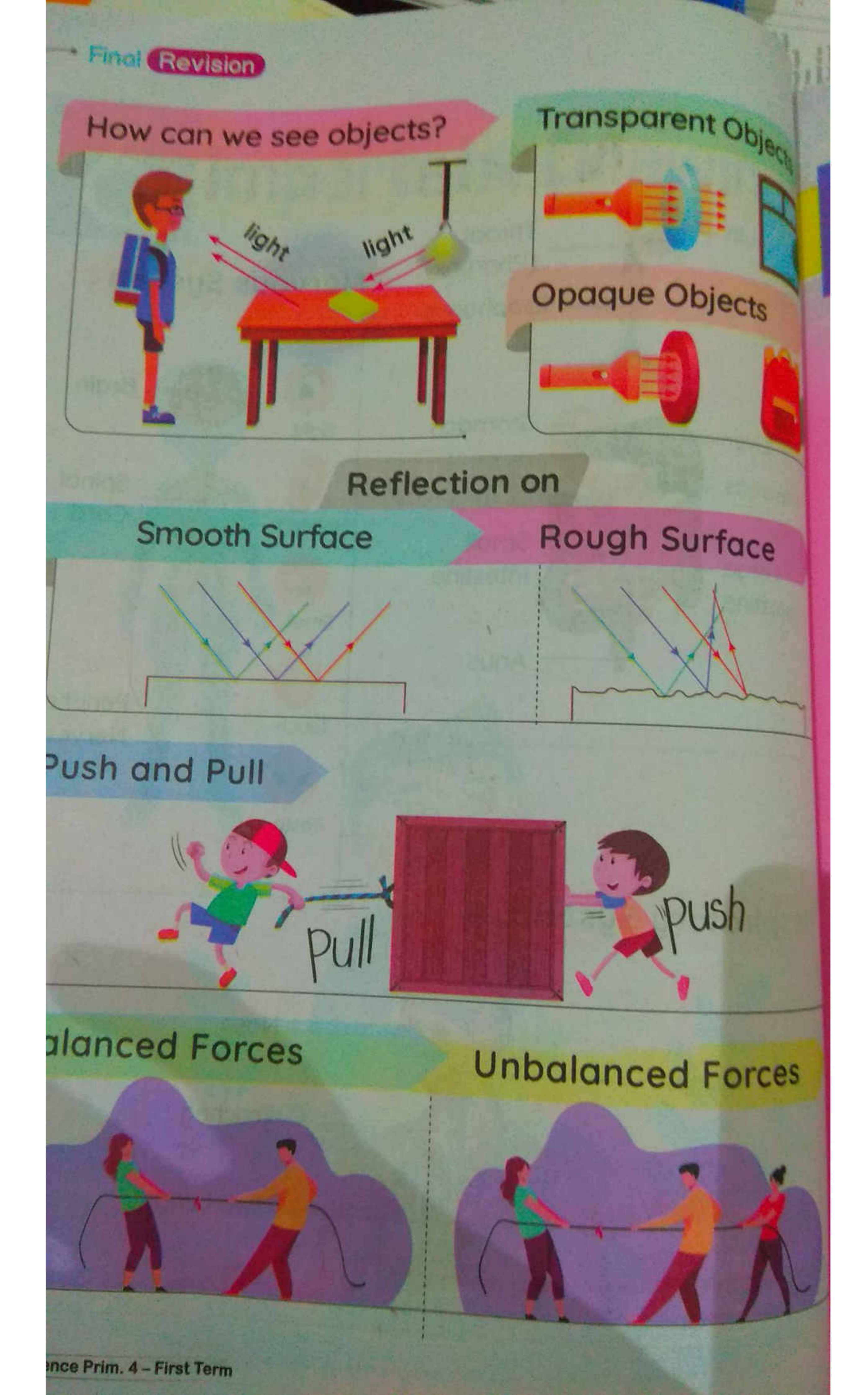
Nocturnal animals	They are animals that adapted to be active at night.
Brain	The main control center of the body that translates and processes information.
Spinal cord	It is located inside the backbone and it carries messages from the brain to the body and vice versa.
Nerves	They are branches that are distributed through all body p
Sensory receptors	They are nerves found in the sensory organs that receive information from the environment.
Reaction time	Time taken by the organism's body to respond to danger and get away from it.
Reflex	A type of message that is transmitted very fast.
Source of light	Something that emits its own light.
Light	It is a visible form of energy that travels in the form of wave
Tapetum lucidum	It is a thin reflective layer at the back of an animal's eyes that reflects light to collect all available light.
Light reflection	It is the bouncing of light rays when they fall on a reflecting surface.
Shiny materials	They are materials that reflect most light rays that fall on them.
Rough naterials	They are materials that reflect some light rays that fall on them.
ransparent naterials	They are materials that allow light to pass through.
paque aterials	They are materials that don't allow light to pass through

Term	Definition
Morse code	It is one of the communication systems for long distances that was developed by Morse.
Code	It is a pattern that has a meaning.
Pulling force	It is the force that moves objects toward you.
Pushing force	It is the force that moves objects away from you.
Gravity	It's the force that pulls the objects downward.
Motion	It is the change in an object's position as time passes relative to a fixed point.
Force	It is a push or pull that is applied to an object to change its position.
Friction force	It is a force that arises between two touching surfaces and it always slows down or stops moving objects.
Energy	It is the ability to do work.
Work	It is the exerted force applied to on object to move it.
Potential energy	It is the energy stored in an object due to its position.
Kinetic energy	It is the energy an object has due to its motion.
Cricket game	A famous game in which the player hits the ball with a wooden bat.
Seatbelt	It prevents the driver's body from moving forward during collision.
Airbag	It absorbs the energy of the car during collision.
Collision	It is the crashing of two objects together.
Speed	It is the distance covered by a moving object in a unit of ti

6 Important Drawings




Digestive System
Mouth
Throat
(Pharynx)
Esophagus
Liver
Stomach
Pancreas
Large
Intestine
Small
Intestine
Anus
Nervous System
Sight
Hearing
Smell
Touch
Taste
Brain
Spinal
Cord
Peripheral
Nerves
Respiratory System
Nose
Pharynx
Trachea
Two Lungs
Diaphragm



Final Revision
How can we see objects?
light
light
Transparent Objects
Opaque Objects
Reflection on
Smooth Surface
Rough Surface
Push and Pull
Pull
push
Balanced Forces
Unbalanced Forces



Model Exams

Exams Sources:

These model exams are taken from:

1. Government exams
2. Ministry model exams
3. Egyptian Knowledge Bank
4. Pony questions

Model Exam 1

1 Choose the correct answer:

1. In order for the human being to remain alive, there must an integration between the senses and the .... system interact with the surrounding environment.
   a. digestive
   b. respiratory
   c. nervous
   d. circulatory

2. .... pant to lower their body temperature.
   a. Whales
   b. Bats
   c. Lions
   d. Foxes

3. When the driver stops suddenly, all the passengers will move ....
   a. upward
   b. forward
   c. backward
   d. downward

4. Each of the following is considered a source of light, except ....
   a. the fire
   b. the sun
   c. the lamp
   d. the moon

5. Raising the thumb up and lowering it down are kinds of ....
   a. colors
   b. codes
   c. waves
   d. lights

Put (✓) or (✗):

1. The respiratory system is responsible for the entry of air rich in oxygen gas into the body. (
2. Foxes have a strong sense of hearing. (
3. The moon is a source of light. (

4. Red and green traffic lights are codes. ( )
5. The driver should drive as fast as possible to avoid accidents. ( )

3 **Calculate the speed of a train that covers 600 km in a time of 6 hours.**

....

....

....

4 **Which of the following surfaces represents the reflection of light rays from a wooden spoon and why?**

(A) (B)

....

....

....

Model Exam 2

Choose the correct answer:

1. .... energy affects the sensory receptors in the eye causing vision.
   a. Sound
   b. Kinetic
   c. Light
   d. Magnetic
2. The eye sends messages to the .... through the nerves.
   a. spinal cord
   b. heart
   c. lungs
   d. brain
3. .... cover(s) body of an Arctic fox.
   a. Thick fur
   b. Heavy hair
   c. Heavy skin
   d. Many feathers
4. Animals can communicate with each other by ....
   a. talking
   b. sound
   c. writing
   d. reading
5. Moving a box away from you represents .... force.
   a. magnetic
   b. gravitational
   c. pulling
   d. pushing

Put (✓) or (✗):

1. The feet of a penguin do not freeze because they have a layer of fat. ( )
2. Bats use their sense of hearing to avoid danger. ( )
3. Wood is a transparent object that allows light to pass through. ( )
4. Bees can know the sweet taste by their sense of smell. ( )
5. The airbag deflates at the same speed as it is inflated. ( )

3 **If the two cars moved at the same time for 20 seconds, car (A) covered a distance of 200 meters, while car (B) covered a distance of 300 meters. Which of the two cars has a higher speed?**

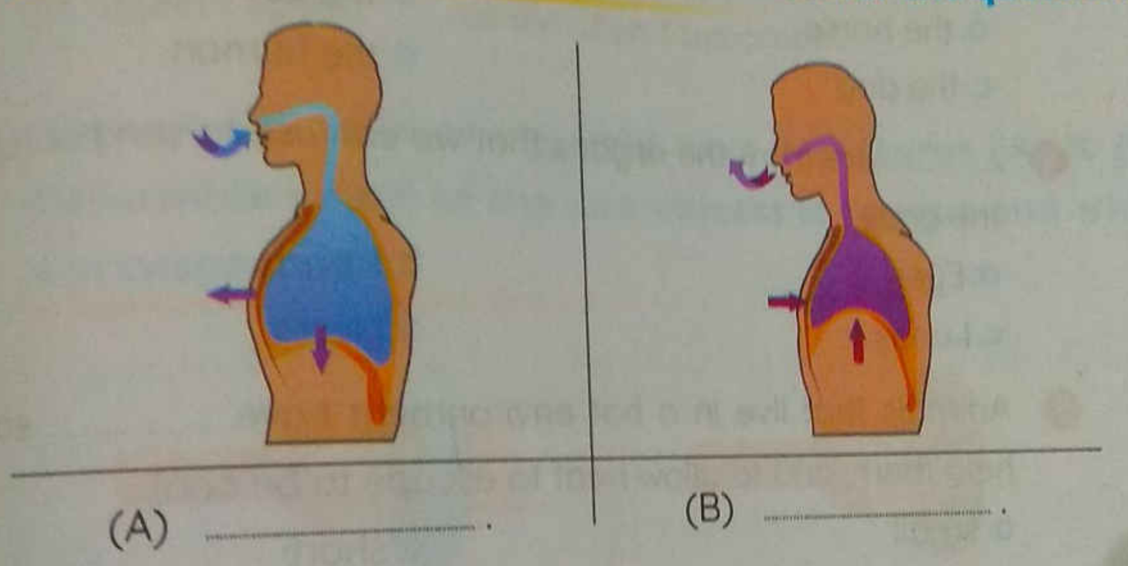
....

....

....

....

4 **Label the following two processes, then answer the questions:**



(A) .... (B) ....

1. What happens to the diaphragm in figure (A)?

....

2. What happens to the chest size in figure (B)?

....

Model Exam 3

1 Choose the correct answer:

1. The skin is an important organ of the ______ system.
   a. digestive
   b. nervous
   c. respiratory
   d. circulatory
2. The pushing and pulling forces are different in ______.
   a. mass
   b. color
   c. direction
   d. energy
3. There is a tapetum lucidum in all of the following, except ______
   a. the horse
   b. the cat
   c. the dog
   d. the human
4. ______ are from the organs that we can use to send or rece the code.
   a. Eyes
   b. Hearts
   c. Lungs
   d. Livers
5. Animals that live in a hot environment have ______ ears help them, and to allow heat to escape to be cool.
   a. small
   b. short
   c. long
   d. sharp

Put (✓) or (✗):

1. During running and making an effort, the number of breathin times decreases. (
2. Dolphins have a strong sense of hearing. (
3. Humans have a tapetum lucidum in their eyes to help them see at night. (

4. Speed is the distance covered by an object multiplied by the time taken. ( )

5. The seatbelt is used to decrease the speed of the driver when he/she moves forward. ( )

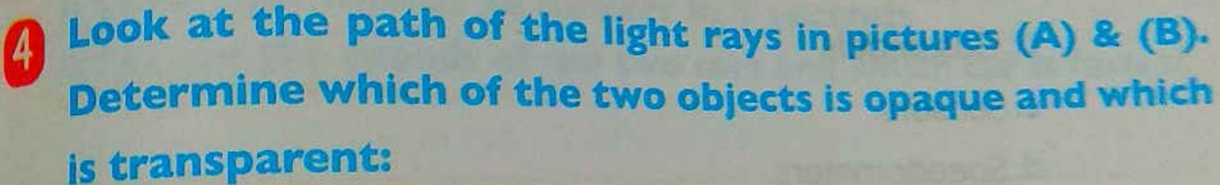
3 **Study the following figure, then choose the correct word:**

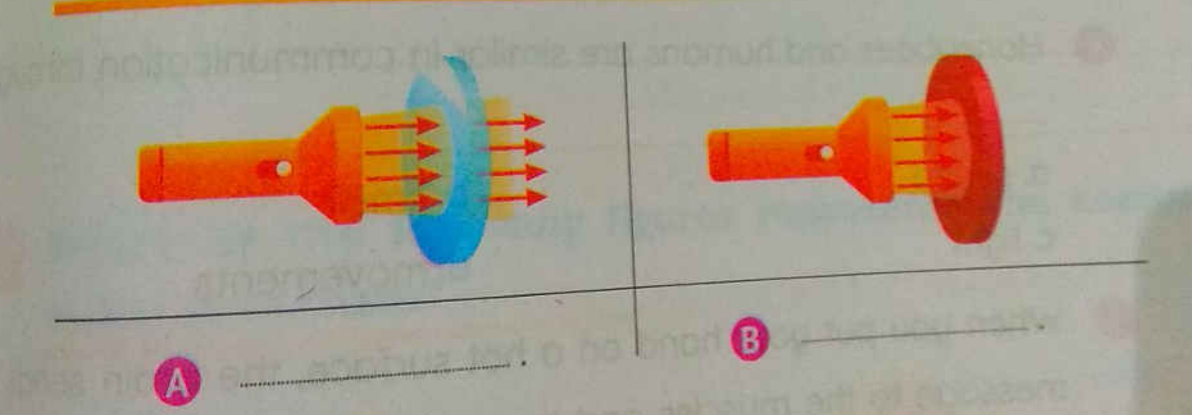
(faster - slower - increases - decreases - remains constant)

a. By using a smaller ball on the same ramp,
the object's speed .... as the object becomes ....

b. By increasing the number of books,
the object's speed .... as the object becomes ....

4 **Look at the path of the light rays in pictures (A) & (B). Determine which of the two objects is opaque and which is transparent:**





A ....

B ....

Model Exam 4

1 Choose the correct answer:

1. Fish extract oxygen out of the water using their ______.
   a. skin b. gills
   c. lungs d. fins

2. Which of the following allows light to pass through it?
   a. A rock b. The moon
   c. Wood d. Glass

3. ______ make the airbag inflate and fill with gas to pro[vide] a soft cushion.
   a. Brakes
   b. Gas pedals
   c. Sensors
   d. Speedometers

4. Honeybees and humans are similar in communication throu[gh] ______.
   a. sound b. smell
   c. light d. movements

5. When you put your hand on a hot surface, the brain sends message to the muscles and the action that comes from y[ou] immediately after it is to ______.
   a. keep placing your hand
   b. feel pain
   c. pull your hand away from the hot object
   d. do nothing

Put (✓) or (✗):

1. The migration of birds to search for food is considered a form of structural adaptation. ( )
2. Nocturnal animals have eyes that are larger than the humans' eyes. ( )
3. If I can see my face clearly on a surface, this means that it is a smooth, shiny surface. ( )
4. A static object has no kinetic energy until unbalanced forces act on it. ( )
5. The apple on the ground has no energy. ( )

A yellow car moves 10 meters in 5 seconds
A green car moves 20 meters in 5 seconds
What are the speeds of the two cars and which car is faster?

....

....

....

4 Which of the following figures represents the correct vision in humans?

Figure (1)

Figure (2)

Model Exam 5

1 Choose the correct answer:

1. The echo sound feature depends on the ________.
   a. sight sense
   b. hearing sense
   c. taste sense
   d. touch sense

2. A static ball on the ________ has no energy.
   a. ramp
   b. table
   c. ground
   d. chair

3. A surface that reflects light rays in the same direction is ________
   a. smooth and shiny
   b. dark with impurities
   c. transparent and clean
   d. rough and dark

4. Humpback whales use singing for ________.
   a. heating
   b. hiding from enemies
   c. communication
   d. having fun

5. Adaptation includes changes that ________ in the environmen
   a. reduce chances of survival
   b. improve species survival
   c. reduce life span for individuals
   d. reduce reproduction process

Put (✓) or (✗):

1. Plants have two types of adaptation, structural and behavio ( )
2. Animals can use more than one sense to communicate with each other. ( )
3. All nocturnal animals need a source of light to see. ( )

4. A static object at the top of a ramp has no kinetic energy. ( )

5. Force affects an object and changes work into energy. ( )

3 From the following figure, calculate the speed of the solar vehicle:

00:20

Time: 20 seconds

1200 meters

....

....

....

4 Classify the following words in the table:

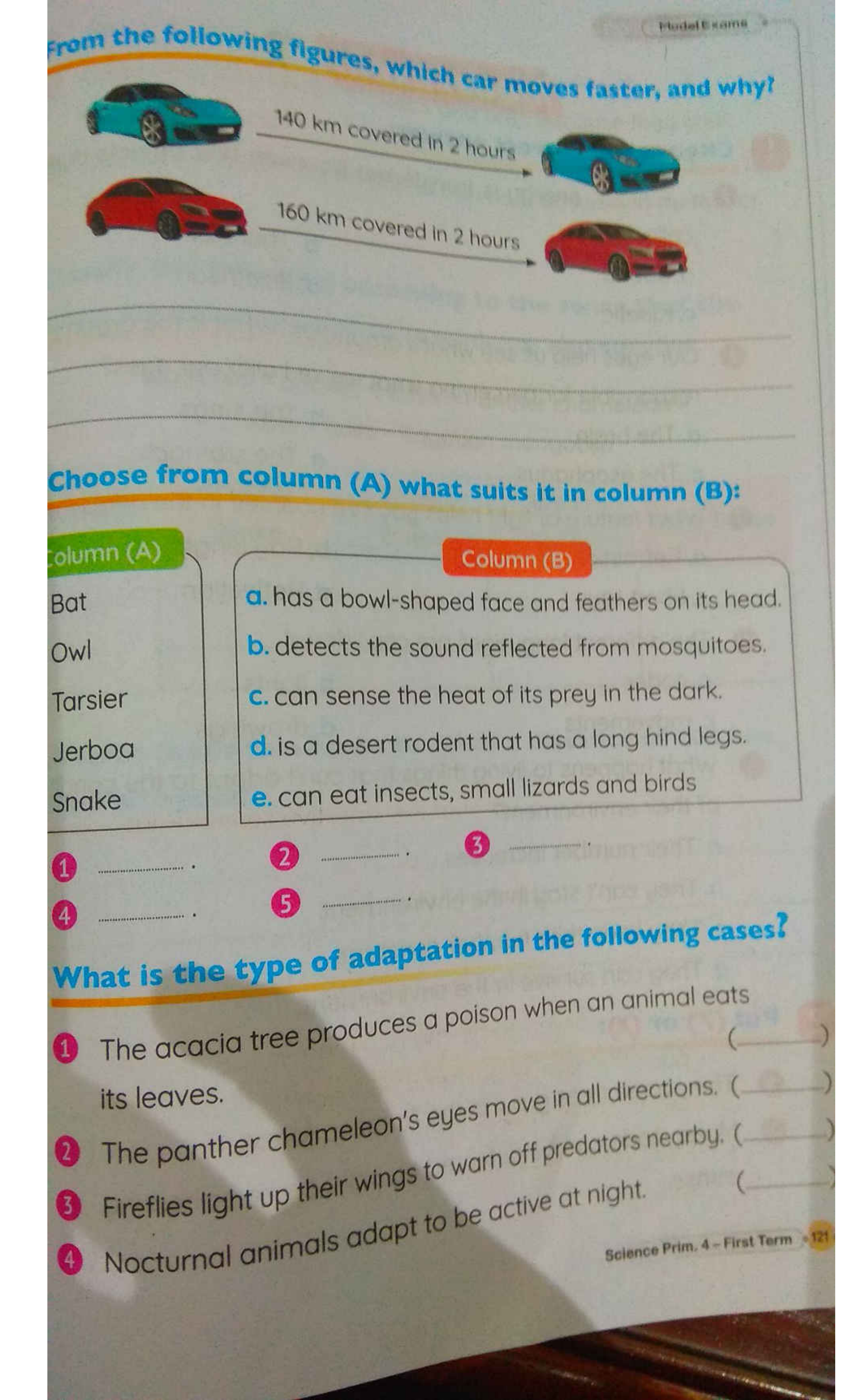
Lungs - Tongue - Nose - Anus - Brain - Alveoli - Liver - Nerves - Stomach - Spinal cord - Small intestine

Digestive System	Respiratory System	Nervous System
....	....	....
....	....	....
....	....	....
....	....	....

Model Exam 6

1 Choose the correct answer:

1. The dolphin can locate its prey through its sense of ______
   a. smell
   b. hearing
   c. sight
   d. taste
2. Which of the following is a source of light?
   a. The eye
   b. The moon
   c. Fire
   d. A mirror
3. Animals can communicate with each other through ______
   a. sounds and lights
   b. talking
   c. reading
   d. writing
4. The stomach is a part of the digestive system that ______
   a. chews food
   b. converts solid food into liquid
   c. absorbs nutrients from food
   d. delivers food into the esophagus
5. In the tug-of-war game, the two teams ______.
   a. push the rope in the same direction
   b. pull the rope in opposite directions
   c. push the rope in opposite directions
   d. pull the rope in the same direction



From the following figures, which car moves faster, and why?

140 km covered in 2 hours

160 km covered in 2 hours

....

....

....

Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
Bat	a. has a bowl-shaped face and feathers on its head.
Owl	b. detects the sound reflected from mosquitoes.
Tarsier	c. can sense the heat of its prey in the dark.
Jerboa	d. is a desert rodent that has a long hind legs.
Snake	e. can eat insects, small lizards and birds

1 .... 2 .... 3 ....

4 .... 5 ....

What is the type of adaptation in the following cases?

1. The acacia tree produces a poison when an animal eats its leaves. (..........)
2. The panther chameleon's eyes move in all directions. (..........)
3. Fireflies light up their wings to warn off predators nearby. (..........)
4. Nocturnal animals adapt to be active at night. (..........)

Model Exam 7

1 Choose the correct answer:

1. ______ energy is transferred between two objects during collision.
   a. Sound
   b. Thermal
   c. Kinetic
   d. Electrical
2. Our eyes help us see what's around us. What is the organ that responsible for perceiving what we see with our eyes?
   a. The brain
   b. The lungs
   c. The esophagus
   d. The stomach
3. What feature of light helps you see yourself in the mirror?
   a. Refraction
   b. Ray length
   c. Short rays
   d. Reflection
4. The different languages are considered ______ .
   a. codes
   b. lights
   c. movements
   d. drawings
5. What happens to living things that can't adapt to the conditions of their environment?
   a. Their number increases.
   b. They can't stay in the environment.
   c. They keep their number constant.
   d. They can survive in the environment.

Put (✓) or (✗):

1. The acacia trees grow in the Amazon forest. ( )
2. Morse code can be detected by sight sense or hearing sense. ( )

3. Some animals can see at night, such as a wild cat. (   )
4. Codes are very useful for bees and ants because they can't talk like humans. (   )
5. Distance covered by an object can be measured in meters or kilograms. (   )

3 Classify the following according to the sense that the living organism uses to communicate and survive:

Dolphins - Snakes - Bees - Panther chameleon - Ants - Bats - Egyptian mongoose

Movement	Hearing Sense	Smell Sense	Touch Sense	Taste Sense
....	....	....	....	....
....	....	....	....	....

4 A train takes five hours to cover a distance of 200 km. Find its speed.

....

....

....

Model Exam 8

1 Choose the correct answer:

1. Humpback whales communicate with each other through the sense of ....
   a. sight
   b. hearing
   c. smell
   d. touch
2. An object's mass affects its ....
   a. potential energy only
   b. kinetic energy only
   c. both kinetic and potential energies
   d. neither kinetic nor potential energies
3. The roots of the palm plants help them to ....
   a. stand strong against the wind
   b. reach the underground soil
   c. fix the plants in the soil
   d. all the previous
4. The .... is an animal that can escape from enemies because of the length of its hind legs.
   a. Arctic fox
   b. jerboa
   c. penguin
   d. panther chameleon
5. Adel wanted to make a suitable box through which he could see what was inside without having to open it. What material should be used?
   a. Wood
   b. A mirror
   c. Carton
   d. Glass

2 Put (✓) or (✗):

1. Man cannot restore the ecosystem in any way. ( )
2. Food turns from complex to simple during digestion. ( )
3. The brain translates the code after receiving it. ( )
4. The object that takes the longest time on the ramp has the biggest mass. ( )
5. Moving an object toward you is considered a pushing force. ( )

3 Classify the following words in the table:

Mirror – Wood – Glass – Metal – Plastic

Shiny Surfaces	Rough Surfaces	Transparent Surfaces
....	....	....
....	....	....
....	....	....

4 Choose from column (A) what suits it in both columns (B) & (C):

Column (A) Living Organisms	Column (B) Way of Communication	Column (C) Depend on
1 Humans	a. use echolocation.	a. light energy only.
2 Fireflies	b. use Morse code.	b. sound energy only.
3 Bats	c. flash their wings.	c. sound and light energies

1 .... 2 .... 3 ....

Model Exam 9

Choose the correct answer:

1. The rope in the tug-of-war game moves when the forces acting on it are ______ .
   a. equal
   b. balanced
   c. unbalanced
   d. equal zero
2. Which of these is an example of camouflage?
   a. Camel's broad feet
   b. Camel's hump
   c. Powerful parrot wings
   d. The fox is golden like its environment.
3. Traffic lights depend on the sense of sight in communication as ______ .
   a. fireflies
   b. dolphins
   c. ants
   d. bats
4. When light is reflected off a surface in different directions, this surface is ______ .
   a. transparent
   b. smooth
   c. rough
   d. opaque
5. Sameh drives his bike, and while he hears a car behind him, he turns away so as not to hit it. The system that received a signal making Sameh realize that is ______ .
   a. the nervous system
   b. the respiratory system
   c. the digestive system
   d. the circulatory system

ut (✓) or (✗):

The fur that some animals possess to protect them from the cold is a behavioral adaptation. ( )

2. The brain is responsible for processing information. ( )
3. The goalkeeper catches the ball by the pushing force of his hands. ( )
4. Humpback whales change their sound pitch according to the seasons. ( )
5. The object that covers the same distance in a longer time, its speed increases ( )

3 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Light	a. depends on the body's sense of heat for predation.
2. An owl	b. depends on the echo of the sound in locating the prey.
3. A snake	c. is an animal with a bowl-shaped face.
4. A bat	d. it is the visible form of energy that is transmitted in the form of waves.
5. Mirror-like membrane	e. a structural adaptation in the eye that provides some animals with better vision at night
	f. a sense that helps us hear birds.

1. ______ . 2. ______ . 3. ______ .
4. ______ . 5. ______ .

4 Study the following figure, then answer the questions:

1. What does the following figure represent? ______
2. Does this system exist in humans only? ______
3. Label the following:
   1. ______
   2. ______
   3. ______

Model Exam 10

1 Choose the correct answer:

1. One of the adaptations that help an animal protect itself from enemies is ....
   a. blending in
   b. extinction
   c. immigration
   d. reproduction
2. .... is from the opaque objects.
   a. Glass
   b. Carton
   c. Plastic
   d. Air
3. The .... system helps us to translate messages that come from our surroundings, such as smells and sounds.
   a. respiratory
   b. digestive
   c. circulatory
   d. nervous
4. Sending smelly messages when there is a shortage of food is the function of ....
   a. queen ants
   b. nurse ants
   c. scout ants
   d. solider ants
5. To calculate the speed of the runner, we use the rule: ....
   a. Speed = distance – time
   b. Speed = distance × time
   c. Speed = distance ÷ time
   d. Speed = distance + time

Put (✓) or (✗):

Some animals that live in the cold have long ears to help them to maintain their body temperature. ( )

The nervous system works separately from the five senses. ( )

3. Gravitational force is an upwards pulling force. ( )
4. The sun is a natural source of light. ( )
5. When you kick a ball, kinetic energy is produced. ( )

Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. The spinal cord	a. it is similar in its processing of information to a computer.
2. Using the sense of sight	b. when a foreign object is brought into your eyes.
3. The brain	c. when an object falls from your hands.
4. The reflex occurs	d. the transmission of commands to the muscles to contract.

1. .... 2. .... 3. .... 4. ....

Omar rode his bike 15 kilometers in 3 hours, how fast was he going? Rashida rode her bike 30 kilometers in 2 hours, how fast was she going? Which rider is the fastest? And why?

....

....

....

Model Exam 11

Choose the correct answer:

1. Cats' eyes are adapted to night vision due to the presence of the .... behind their eyes.
   a. wide eyes
   b. eye pupil
   c. tapetum lucidum
   d. eye lens

2. Kinetic energy is the energy gained by an object due to its ......
   a. position
   b. shape
   c. motion
   d. size

3. What carries the message from your eyes to your brain when you see something?
   a. Nerves
   b. Muscles
   c. Veins
   d. Glands

4. A blind person's cane and .... emit high-pitched sounds that bounce off form echo.
   a. lizards
   b. bats
   c. bull sharks
   d. polar bears

5. What is adaptation?
   a. The process by which new species appear.
   b. A form of pollination for trees.
   c. A feature owned by living things to help them survive.
   d. A process of getting rid of harmful substances in living things

Put (✓) or (✗):

1. Animals digging trenches is a form of structural adaptation. ( )
2. Reflex is the time taken for the body to receive information from the environment. ( )
3. All objects around us move at different speeds. ( )
4. Long beeps in Morse code are represented by dots. ( )
5. Food stays in the stomach for a few minutes. ( )

Complete using the following words:

(Penguins - Owls - Bats - Bull Sharks - Fennec foxes - Polar foxes - Panther chameleons)

1. .... pant to lower their bodies temperature.
2. .... are from the nocturnal animals that have poor night vision.
3. .... have the ability to rotate their heads in all directions, and it is called super sensory adaptation.
4. .... can sneak up on its prey using countershading.

Arrange the following steps that represent the vision process:

(............) Brain translates these signals.

(............) Eye pupils allow the light to enter the eyes.

(............) Light falls on objects.

(............) Sensory receptors at the back of the eyes send signals to the brain.

(............) Light reflects on the eyes.

Model Exam 12

Choose the correct answer:

1. .... is the force that attracts objects toward Earth's surface.
   a. Magnetic energy b. Electrical energy
   c. Friction force d. Gravity

2. The light-reflecting materials include ....
   a. wood b. mirrors
   c. plastic d. paper

3. To communicate through the sense of sight, we need ....
   a. to make sound b. light
   c. to hear music d. to touch something

4. The eagle is a bird that eats the meat of its prey. Its beak is strong and sharp. This structural adaptation helps it to ....
   a. see b. find a shelter
   c. rip meat d. escape

5. Songs of humpback whales in winter are characterized by ....
   a. high-pitched sounds
   b. low-pitched sounds
   c. rough sounds
   d. weak sounds

...ut (✓) or (✗):

Bats use light as a means of communication with each other. ( )

The spinal cord is an important organ of the digestive system. ( )

Fish have gills to expel oxygen underwater. ( )

4 When a moving bike hits a man, he may be injured only and survive. ( )

5 Digestion of food begins in the mouth. ( )

Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Carbon dioxide	a. is a common organ in the digestive and respiratory systems.
2 Diaphragm	b. is a gas necessary for respiration.
3 Throat (pharynx)	c. is a muscle that has an important role in the breathing process.
4 Oxygen	d. is a gas produced by respiration.

1 .... 2 .... 3 .... 4 ....

Study the following table, then complete:

	Car (A)	Car (B)	Car (C)
Distance (Meters)	200	200	100
Time (Seconds)	4	2	2

....

....

....

a. Car (........) is the fastest one.

b. Cars (........) and (........) move with the same speed.

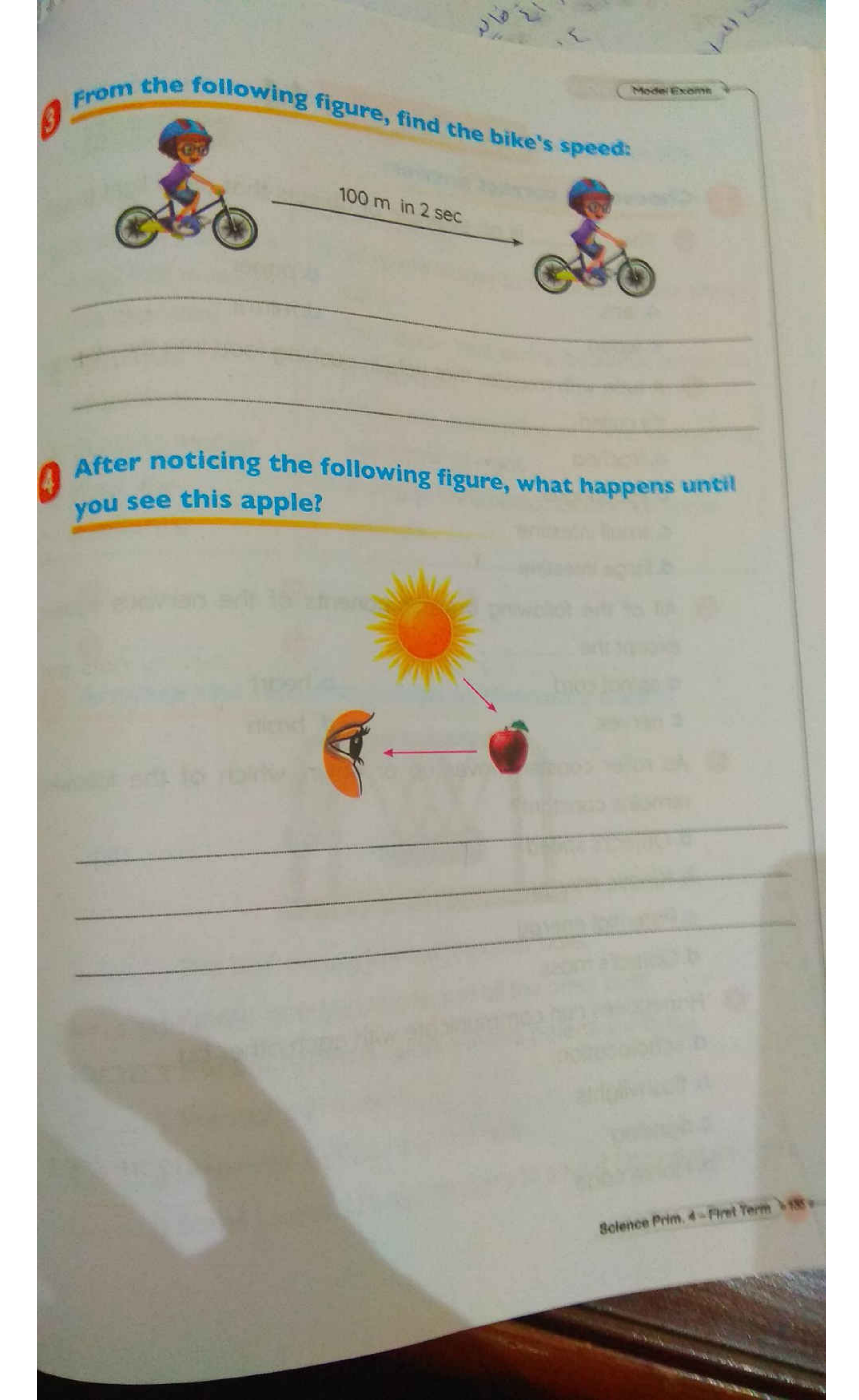
Choose the correct answer:

1. .... mix(es) and grind(s) food inside the mouth.
   a. Teeth only
   b. Tongue only
   c. Saliva only
   d. Teeth and tongue
2. As the angle of the inclined ramp decreases, the object's speed ....
   a. increases
   b. decreases
   c. remains constant
   d. becomes zero
3. When light falls on a dark surface, ...
   a. the surface absorbs the light
   b. light passes through it
   c. the light is refracted
   d. nothing happens
4. The bat is considered a .... animal.
   a. nocturnal
   b. morning
   c. harmful
   d. non-flying
5. Morse code consists of .... beeps known as dots and .... beeps known as dashes.
   a. short - short
   b. long - long
   c. short - long
   d. long - short

Choose from column (A) what suits it in column (B):

olumn (A)	Column (B)
ght	a. it does not absorb food.
amouflage	b. a type of adaptation that helps animals to hide.
ophagus	c. ants use it to sense and communicate smells.
aphragm	d. it helps us see.
nell	e. a muscle that plays an important role in breathing.

.... 2 .... 3 .... 4 .... 5 ....



3 From the following figure, find the bike's speed:

____

____

____

4 After noticing the following figure, what happens until you see this apple?

____

____

____

Model Exam 14

Choose the correct answer:

1. The ______ is an example of objects that allow light to pass through.
   a. lens
   b. paper
   c. wood
   d. mirror
2. A tube with muscles that help in pushing food into the stomach it's called ______ .
   a. trachea
   b. esophagus
   c. small intestine
   d. large intestine
3. All of the following are components of the nervous system except the ______ .
   a. spinal cord
   b. heart
   c. nerves
   d. brain
4. As roller coaster moves up or down, which of the following remains constant?
   a. Object's speed
   b. Kinetic energy
   c. Potential energy
   d. Object's mass
5. Honeybees can communicate with each other by ______ .
   a. echolocation
   b. flashvlights
   c. dancing
   d. Morse code

2 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Nerves	a. bronchioles
2 Branches inside the lungs that resemble tree branches	b. carry messages to the brain via the spinal cord.
3 Behavioral adaptation	c. the kapok tree emits beautiful scents to attract bats.
4 Vibrating motion	d. structural adaptation of some animals to see better at night.
5 Mirror-like membrane	e. a way to communicate between some animals

1 ________ . 2 ________ . 3 ________ .

4 ________ . 5 ________ .

Arrange the following steps in Newton's cradle:

(________) The ball moves toward the other balls.

(________) Kinetic energy transfers to all the other balls.

(________) The ball is raised up so it stores potential energy.

(________) The last ball moves.

(________) When the ball hits the first ball.

(________) Some kinetic energy changes to sound and heat energies.

Model Exam 15

hoose the correct answer:

We can say an object is in a state of motion when its .... changes

a. shape

b. size

c. color

d. position

When your eyes see a red traffic light, it sends a signal to you to ....

a. increase the speed

b. decrease the speed

c. keep your speed

d. start moving

.... puff up (blow) their bodies with the air to scare their enemies.

a. Bull sharks

b. Panther chameleons

c. Snakes

d. Jerboas

When light strikes an opaque object, ...

a. light reflects

b. light refracts

c. shadow is formed

d. light passes through it

.... have the ability to turn their heads in all directions.

a. Snakes

b. Jerboas

c. Dolphins

d. Owls

2 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Kilometer	a. it is the change in an object's position.
2 Respiration	b. it is the visible form of energy that is transmitted in the form of waves.
3 Energy	c. the force that pulls things downwards.
4 Gravity	d. the process of pushing air in and out of the body.
5 Motion	e. a measuring unit for long distances
6 Light	f. it is the ability to do work

1 .... 2 .... 3 ....

4 .... 5 .... 6 ....

3 Answer the following questions:

1. A dolphin can locate living organisms and things under the surface of the water. Explain the feature that helps the dolphin to do so.

....

....

2. There are some nocturnal animals that depend on their sharp senses to get their prey, give examples.

....

....

3. Snakes depend on identifying their prey and catching them at night by sensing heat. Determine the reason.

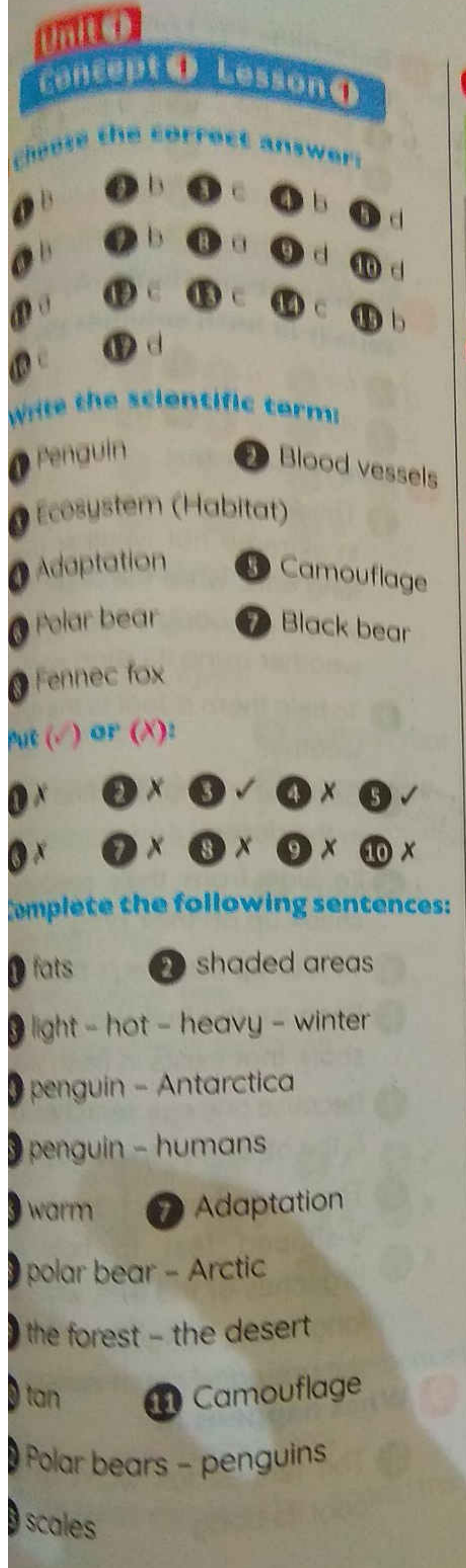
....

....

8 Guide Answers

Unit 1

Concept 1 Lesson 1



Choose the correct answer:

1 b 2 b 3 c 4 b 5 d

6 b 7 b 8 a 9 d 10 d

11 d 12 c 13 c 14 c 15 b

16 c 17 d

Write the scientific term:

1 Penguin 2 Blood vessels

3 Ecosystem (Habitat)

4 Adaptation 5 Camouflage

6 Polar bear 7 Black bear

8 Fennec fox

Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✓ 4 ✗ 5 ✓

6 ✗ 7 ✗ 8 ✗ 9 ✗ 10 ✗

Complete the following sentences:

1 fats 2 shaded areas

3 light – hot – heavy – winter

4 penguin – Antarctica

5 penguin – humans

6 warm 7 Adaptation

8 polar bear – Arctic

9 the forest – the desert

10 tan 11 Camouflage

12 Polar bears – penguins

13 scales

5 Complete the following table:

P.O.C.	Fennec Fox	Polar Bear	Black Bear
Habitat	Desert	Arctic region	Forest
Fur Color	Tan	White	Black

6 Choose from column (A) what suits it in both columns (B) & (C):

1 d – d 2 a – b

3 e – e 4 c – a

7 Study the following then answer the questions:

1 (1) & (3) 2 (2)

3 (2), (5) & (6) 4 (5)

8 Give reasons for:

1 Because adaptation helps all living organisms to survive and reproduce in their habitat.

2 To adapt to the hot weather in summer.

3 To keep its body warm in the cold region.

4 Because in penguin's feet, the warm blood vessels weave around cold blood vessels to heat it up.

5 To hide from predators or prey.

9 What's happen if:

1 The animal may die.

2 Penguins can't be able to overcome the hot climate and they will die.

Unit 1

Concept 1 Lesson 2

1 Choose the correct answer:

1 b 2 c 3 a 4 c 5 b
6 d 7 b 8 c 9 b 10 b
11 a 12 c 13 d 14 b 15 c
16 c 17 b 18 b

2 Complete the following sentences:

1 behavioral
2 fennec foxes – Arctic foxes
3 warm – cool 4 tan – the desert
5 white – brown 6 smaller
7 fennec – Arctic
8 countershading 9 salt – fresh
10 independently – food – to avoid predators

3 Write the scientific term:

1 Behavioral adaptation
2 Bull shark 3 Fennec fox
4 Arctic fox
5 Structural adaptation

4 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✓
6 ✗ 7 ✓ 8 ✓

5 Campare between the following:

P.O.C.	Fennec Fox	Arctic Fox
abitat	Desert	Tundra
Fur olor	Tan	White in winter Brown in summer
ape Ears	Extra Large Ears	Small ears

6 Determine the type of adaptation in the following:

1 Structural 2 Behavioral
3 Behavioral 4 Behavioral
5 Structural 6 Behavioral
7 Structural 8 Structural

7 Choose from column (A) what suits it in both columns (B) & (c):

1 c – e 2 e – c
3 d – a 4 b – d

8 Give reasons for:

1 The fennec fox can cool its bod in extreme hot weather using it long ears, while the Arctic fox ca warm its body in extreme co weather using its short ears.
2 To help them adapt to the extrem weather.
3 Because it is hard to find any fo in the desert.
4 To hide from their predators sneak up on their prey.
5 To tear up the prey's flesh
6 Because the bull shark is the shark that exists in fresh wate
7 Because one eye searches for & the other eye to avoid dang
8 The panther chameleon V-shaped feet to hold or branches of the tree, while it long sticky tongue to hunt, the prey and catch insects.

9 What happens if:

1 The fennec fox won't be a cool its body.

2. It puffs its body with air, opens its mouth wide and changes the color of its scales.

3. It finds less competition in finding food.

Unit 1

Concept 1 Lesson 3

1 Choose the correct answer:

1. d 2. d 3. b 4. c 5. b
6. c 7. b 8. a 9. b 10. c
11. c 12. d 13. c 14. a 15. b
16. b 17. c 18. b 19. d

2 Write the scientific term:

1. Amazon rainforest
2. Savannah forest
3. Taproots 4. Buttress root
5. Kapok tree 6. Acacia tree
7. Kapok tree leaf
8. Pine tree 9. Water Lily
10. Palm tree
11. Mangrove tree
12. Behavioral adaptation

3 Put (✓) or (✗):

1. ✗ 2. ✗ 3. ✓ 4. ✗ 5. ✓
6. ✗ 7. ✓ 8. ✓ 9. ✗ 10. ✗
11. ✓ 12. ✗ 13. ✗ 14. ✓ 15. ✗
16. ✓ 17. ✓

4 Complete the following sentences:

1. structural - behavioral
2. Amazon rainforests - acacia trees
3. soggy - strong
4. drought- water
5. taproot- search for water in the deep soil 6. water - fats
7. giraffe 8. Barbary figs - spines
9. acacia tree
10. buttress - upward - soggy.
11. hand shaped - tearing 12. Bats
13. water lily - mangrove tree
14. triangular - short
15. thick - small - wind
16. long - strong - waves

5 Cross out the odd word:

1. Attract bats 2. Sharp spines
3. Pine tree
4. Savannah forests
5. Amazon rainforests

6 Compare between the following:

1.

P.O.C	Savannah Forests	Amazon Rainforests
Trees in the Forest	Acacia tree	Kapok tree
Characteristics	1. Grass 2. Drought 3. mild	1. Soggy 2. Easy 3. Strong winds

2

P.O.C	Acacia Tree	Kapok Tree
Habitat	Savannah forest	Amazon rainforest
Shape	Umbrella shape	Umbrella shape
Roots Name	Taproot roots	Buttress roots
Leaves	Tiny Leaves	Hand-shaped leaves

3

P.O.C	Palm Tree	Mangrove Tree
Habitat	Desert	Salty water
Roots Shape	Thick	Long - strong

4

P.O.C	Water Lily	Acacia Tree
Habitat	Wetland	Savannah forest
Leaves Shape	Wide	Tiny

7 Choose from column (A) what suits it in both column (B) & (c):

1. b - d
2. d - a
3. e - b
4. a - e

8 Determine is the type of adaptation in the following:

1. Structural
2. Behavioral
3. Structural
4. Structural
5. Structural

9 Study the following figures, then answer the questions:

1. (a) palm tree - the desert - tiny - resist strong winds.
   (b) acacia tree - savannah forests - tiny - hold water.
   (c) pine tree - the snow - needle - hold water.
   (d) kapok tree - Amazon rainforests - tiny - allow wind to move through without cutting it.
2. Figures (2), (4) have umbrella shape. Figure (3) has a triangular shape.
3. Figure (2) has taproot roots. Figure (3) has buttress roots.

10 Give reasons for:

1. Because plants have structural & behavioral adaptations that help them survive.
2. Taproot roots help acacia trees to search for water in the deep soil, while buttress roots fix kapok trees firmly in the soggy soil.
3. Tiny leaves help acacia trees hold water, while spines protect it from hungry animals.
4. To allow wind to move gently through it without tearing or cutting it.
5. To absorb the sunlight.
6. To resist strong wind in the desert.
7. To allow snow to slide easily on it without breaking its branches.

11 What happens if:

1. Acacia roots won't reach water from the deep soil.
2. The acacia tree begins to produce poison to protect itself.

The palm tree won't be able to resist winds and it may die.

The snow will break the branches of the pine tree.

Unit 1 Concept 1 Lesson 4

Choose the correct answer:

1 c, 2 d, 3 d, 4 a, 5 c
6 b, 7 a, 8 a, 9 b, 10 c
11 d, 12 b, 13 c, 14 b, 15 d
16 c, 17 b, 18 c, 19 b, 20 d
21 a, 22 b, 23 d, 24 c, 25 d

Put (✓) or (✗):

1 ✗, 2 ✓, 3 ✗, 4 ✓, 5 ✗
6 ✗, 7 ✓, 8 ✗, 9 ✓, 10 ✗
11 ✓, 12 ✓, 13 ✗, 14 ✓, 15 ✗
16 ✗, 17 ✓, 18 ✗, 19 ✗

Write the scientific term

1 Digestive system, 2 Mouth
3 Saliva, 4 Stomach
5 Esophagus
6 Large intestine
7 Small intestine, 8 Blood
9 Small intestine, 10 Inhalation
11 Alveoli, 12 Blood
13 Diaphragm, 14 Exhalation

Cross out the odd word:

1 Trachea, 2 Liver
3 Throat, 4 Chest size decreases

5 Classify these organs according to the systems they belong to:

Digestive System	Respiratory System
Pharynx	Pharynx
Stomach -	Diaphragm
Anus - Tongue	Trachea
Liver	Nose
Small intestine	Lungs
	Alveoli

6 Complete the following sentences:

1 specific function. 2 organs
3 Digestive - respiratory
4 digestive 5 mouth - anus
6 Digestion
7 Teeth - tongue 8 esophagus
9 stomach - esophagus
10 stomach acids - digestive juices - a soupy Liquid
11 hours - the small intestine
12 Liver - pancreas - small substances.
13 The blood
14 water - solid waste - anus
15 sitting - quickens
16 oxygen - carbon dioxide
17 trachea - bronchioles
18 alveoli 19 blood.
20 inhalation - exhalation
21 contracts - oxygen - increases
22 relaxes - carbon dioxide - decreases
23 respiratory 24 vitamin C

7 Compare between the following:

1

P.O.C	Digestive System	Respiratory System
Function	To get the needed energy from food & growth.	To supply the body with oxygen gas and get rid of carbon dioxide gas.
Organs	Mouth- Pharynx Stomach - Liver	Nose - Pharynx Trachea Lungs

2

P.O.C	Stomach	Lungs
System	Digestive system	Respiratory system
unction	Convert food into a soupy liquid.	Extract oxygen from the air & expel carbon dioxide out of the body.

3

P.O.C	inhalation	Exhalation
aphragm	Contracts	Relaxes
est Size	Increases	Decrease
Rich in	Oxygen gas	Carbon dioxide gas

hoose from column (A) what uits it in column (B):

:

d 2 f 3 a

b 5 e 6 c

B:

1 c 2 d 3 b 4 a

9 Label the following figures:

Figure (A)

1 Mouth 2 Esophagus
3 Liver 4 Stomach
5 Pancreas 6 Large intestine
7 Small intestine

Figure (B)

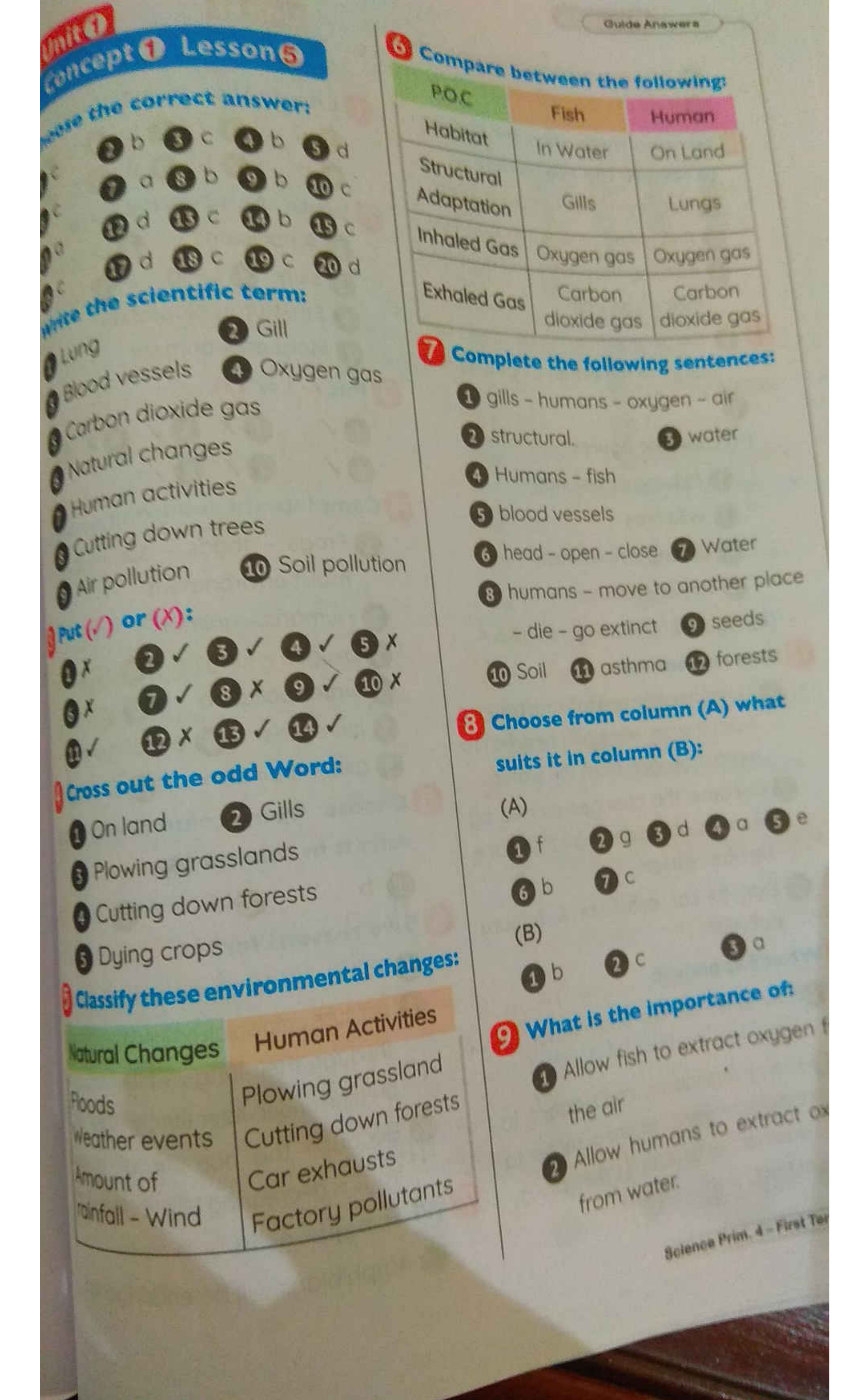
1 Nose 2 Pharynx
3 Trachea 4 Lungs
5 Diaphragm

10 Give reasons for:

1. To get the energy needed from food that allow humans to do all activities.
2. Teeth and tongue crush food during chewing and saliva facilitates swallowing food.
3. Because they secrete juices that help in breaking down food into nutrients.
4. Because the diaphragm directs inhalation & exhalation processes.
5. To keep the respiratory system healthy.
6. To keep the digestive system healthy.

11 What happens if:

1. Swallowing food becomes very difficult.
2. They will harm our digestive system.
3. This will harm our respiratory system.
4. Carbon dioxide gas will be expelled out of the body.



Unit 1 Concept 1 Lesson 5

...oose the correct answer:

1 c 2 b 3 c 4 b 5 d
6 c 7 a 8 b 9 b 10 c
11 c 12 d 13 c 14 b 15 c
16 a 17 d 18 c 19 c 20 d

...rite the scientific term:

1 Lung 2 Gill
3 Blood vessels 4 Oxygen gas
5 Carbon dioxide gas
6 Natural changes
7 Human activities
8 Cutting down trees
9 Air pollution 10 Soil pollution

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✗ 9 ✓ 10 ✗
11 ✓ 12 ✗ 13 ✓ 14 ✓

4 Cross out the odd Word:

1 On land 2 Gills
3 Plowing grasslands
4 Cutting down forests
5 Dying crops

5 Classify these environmental changes:

Natural Changes	Human Activities
Floods	Plowing grassland
Weather events	Cutting down forests
Amount of rainfall - Wind	Car exhausts
	Factory pollutants

6 Compare between the following:

P.O.C	Fish	Human
Habitat	In Water	On Land
Structural Adaptation	Gills	Lungs
Inhaled Gas	Oxygen gas	Oxygen gas
Exhaled Gas	Carbon dioxide gas	Carbon dioxide gas

7 Complete the following sentences:

1 gills - humans - oxygen - air
2 structural. 3 water
4 Humans - fish
5 blood vessels
6 head - open - close 7 Water
8 humans - move to another place - die - go extinct 9 seeds
10 Soil 11 asthma 12 forests

8 Choose from column (A) what suits it in column (B):

(A)
1 f 2 g 3 d 4 a 5 e
6 b 7 c

(B)
1 b 2 c 3 a

9 What is the importance of:

1 Allow fish to extract oxygen f... the air
2 Allow humans to extract ox... from water.

3. It is very important for respiration.
4. It carries oxygen to all body parts.

10 Mention three ways for human to restore the ecosystem:

1. Replanting the removed forest.
2. Preventing air & water pollution.
3. Keeping the plants and animals in their ecosystem.

11 1. The penguin may die, because it can't adapt to the extreme hot weather.

2.

(a) Label the figures:

1. Plowing grasslands
2. Wild fires
3. Cutting down forests
4. Factory pollution

(b) Figure 2 (c) Figures 1, 3 & 4

Give reasons for:

1. Lungs help humans to extract oxygen from the air, while gills help fish to extract oxygen from the water.
2. Because the changes caused by humans are faster than that done by nature itself.
3. Due to car exhausts & factory pollution.

What happens if:

1. Humans can live underwater like fish.
2. Living organisms can't adapt to these changes, so they move to another ecosystem, die or go extinct.

Unit 1

Concept 1 Lesson 3

1 Choose the correct answer:

1. d 2. c 3. b 4. c 5. c
6. d 7. b 8. d 9. c 10. c

2 Write the scientific term:

1. Amphibians 2. Oxygen gas
3. Skin 4. Lung 5. Scientists
6. Structural adaptation
7. Moist environment

3 Put (✓) or (✗):

1. ✓ 2. ✗ 3. ✓ 4. ✗ 5. ✓
6. ✓ 7. ✗ 8. ✓

4 Complete the following sentences:

1. Frogs - toads - salamanders - moist environment
2. Humans - animals
3. oxygen - lungs 4. skin
5. water pollution 6. structural
7. increases 8. endangered
9. gills - their skin 10. Drought

5 Choose from column (A) what suits it in column (B):

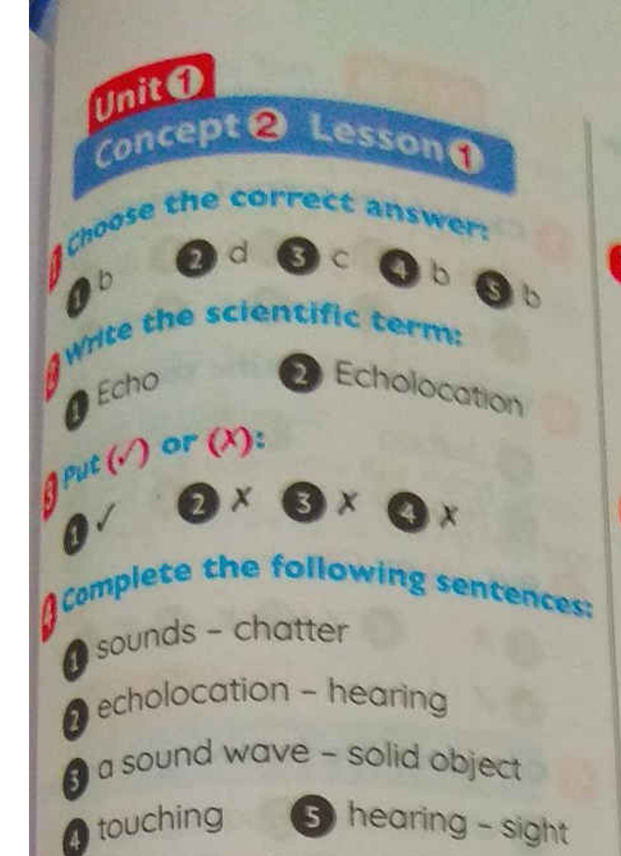
1. b 2. d 3. a

6 Give reasons for:

1. To help endangered species survive
2. Because amphibian on land can breathe through their lungs, while they can breathe underwater through their skin.
3. Because the number of golden frogs is decreasing all over the world.

7 What happens if:

- Amphibians will be endangered.



Unit 1
Concept 2 Lesson 1

1 Choose the correct answer:

1. b 2. d 3. c 4. b 5. b

2 Write the scientific term:

1. Echo 2. Echolocation

3 Put (✓) or (✗):

1. ✓ 2. ✗ 3. ✗ 4. ✗

4 Complete the following sentences:

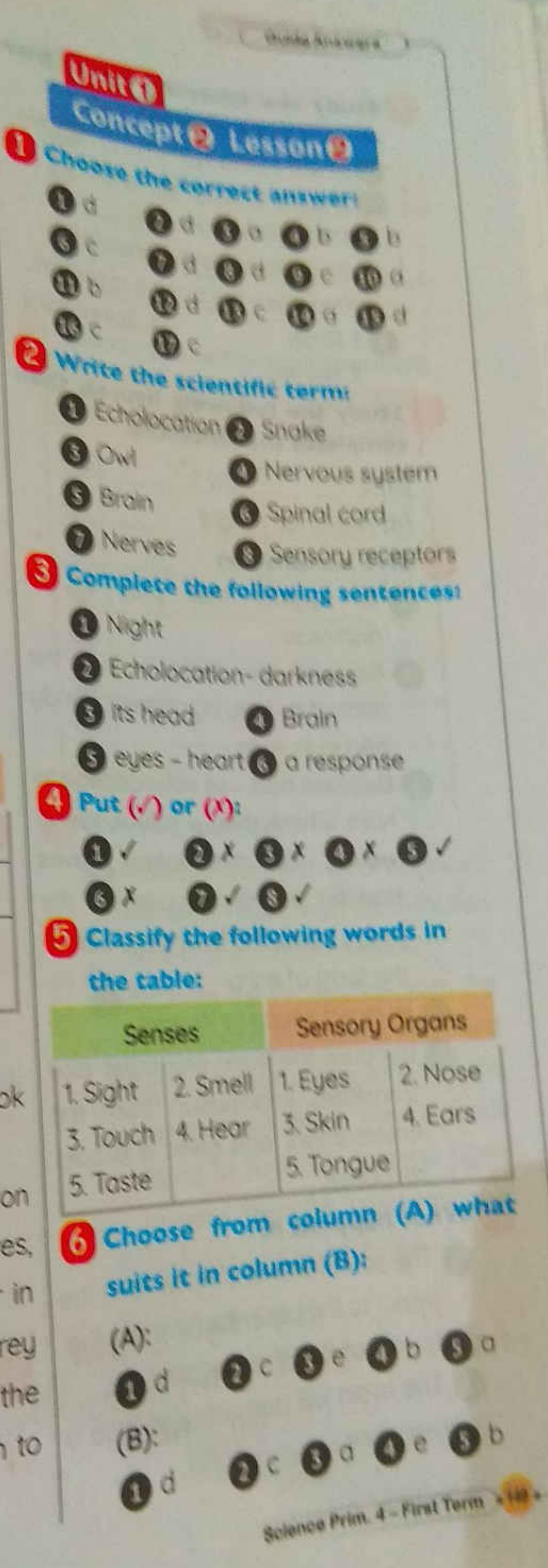
1. sounds - chatter
2. echolocation - hearing
3. a sound wave - solid object
4. touching 5. hearing - sight
6. sight - smell

5 Classify the following animals:

Hunting Strategy	Animal
Countershading	Bull shark
Echolocation	Dolphin - Bat
Camouflage	Fennec fox - Chameleon

6 Give reasons for:

1. To move to another places to look for food.
2. because dolphins use echolocation where they produce sound waves, then the sound waves transfer in the water, then they hit the prey and bounce to the dolphin in the form of echo that allows them to locate the prey.



Unit 1
Concept 2 Lesson 2

1 Choose the correct answer:

1. d 2. d 3. a 4. b 5. b
6. c 7. d 8. d 9. c 10. a
11. b 12. d 13. c 14. a 15. d
16. c 17. c

2 Write the scientific term:

1. Echolocation 2. Snake
3. Owl 4. Nervous system
5. Brain 6. Spinal cord
7. Nerves 8. Sensory receptors

3 Complete the following sentences:

1. Night
2. Echolocation- darkness
3. its head 4. Brain
5. eyes - heart 6. a response

4 Put (✓) or (✗):

1. ✓ 2. ✗ 3. ✗ 4. ✗ 5. ✓
6. ✗ 7. ✓ 8. ✓

5 Classify the following words in the table:

Senses		Sensory Organs	
1. Sight	2. Smell	1. Eyes	2. Nose
3. Touch	4. Hear	3. Skin	4. Ears
5. Taste		5. Tongue	

6 Choose from column (A) what suits it in column (B):

(A):
1. d 2. c 3. e 4. b 5. a

(B):
1. d 2. c 3. a 4. e 5. b

7 Study the following figure, then answer the questions:

1. The nervous system
2. No
3. The nervous system gathers information from the environment and translates it, then gives the body a response.
4. 1. Brain 2. Spinal cord 3. Nerves

8 Study the following figures, then completes the sentences:

(a) 2 (b) 3 (c) 1
(d) nocturnal - night

9 Give reasons for:

1. To surprise their prey in the darkness.
2. Because the snake senses the heat of its prey by a special body part in its face.
3. Because bats use echolocation to hunt, where they produce sound waves, then the sound waves transfer in the air and hit the prey's body and bounce to bats in the form of echo.
4. to direct sound to its ears.
5. because the brain processes and translates information from the environment and gives a proper response.

What happens if:

- The sound waves bounce from the insect to the bat in the form of echo.
- It will not find the prey and die.
- The brain will translate it to give a response.

Unit 1
Concept 2 Lesson 3

1 Choose the correct answer:

1 b 2 c 3 b 4 d 5 a
6 c 7 b 8 c 9 d 10 c

2 Write the scientific term:

1. Jerboa
2. Nervous system
3. Reaction time
4. Brain

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓
6 ✓

4 Complete the following sentences:

1. withdraw
2. danger
3. rodent - large - eyes - long
4. zigzag
5. ear - brain
6. reaction time

5 Arrange the following steps:

1. On hearing danger, the sensory receptors sense it.
2. The sensory receptors in the ears send a message to the brain.
3. The brain translates the message.
4. The brain sends a response to alert the legs of the jerboa.
5. The jerboa jumps in zigzag paths quickly.

6 Choose from column (A) what suits it in column (B):

1 d 2 a 3 c

Give reasons for:

1. Because the nervous system protects them from danger.
2. To hear nearby predators.
3. To jump away quickly when hearing a danger nearby.
4. To catch sand during jumping.

What happens if:

1. She will withdraw her hand away.
2. It will jump away by its long hind legs
3. It will not hear nearby snakes which will hunt it.

Unit 1

Concept 2 Lesson 4

1 Choose the correct answer:

1 a 2 c 3 b 4 c 5 d
6 d 7 a 8 c 9 d 10 b

2 Write the scientific term:

1. Reaction time
2. Nervous system
3. Brain 4 Nerve

Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✗
6 ✓ 7 ✓

Complete the following sentences:

1 faster 2 together
3 hand- signal- response
4 less 5 visual
6 less than

Arrange the following steps:

1. The mobile makes sounds.
2. The sensory receptors in the ears sense the sound.

3. The sensory receptors send a signal to the brain.
4. The brain translates the signal.
5. The brain sends a response to the muscles.
6. Sara holds the mobile to answer the call.

6 Classify the following situations:

	Visual Response	Auditory Response
1	✓	
2		✓
3		✓
4	✓	
5		✓
6		✓
7	✓	
8		✓

7 Give reasons for:

1. Because reaction time of the visual stimuli is faster than the reaction time of the auditory stimuli.
2. Because the information from the environment (hot object) is received by the sensory receptors it in the sense organ (skin), then it sends signal to nerves then send signal to brain, then the brain responds (moving your hand away).

8 What happens if:

3. I will press the brakes to stop the car.
4. I will pay attention to him/her.

Unit 1

Concept 2 Lesson 5

1 Choose the correct answer:

1 b 2 c 3 d 4 c 5 b
6 d 7 b 8 c 9 d 10 c

2 Write the scientific term:

1 Sensory receptors
2 Nerves 3 Brain
4 Reflexes 5 Skin
6 Touch

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✓
6 ✗ 7 ✓ 8 ✓

Complete the following sentences:

1 sensory receptor 2 brain
3 nerves
4 Reflex 5 ears
6 Hearing

Cross out the odd word:

1 Lungs 2 Touch
3 Tongue

ompare between:

.C	Sensory Receptors	Brain
on	Collect information from the environment.	Translates and processes information to give a response.

ly the following figures, and complete:

(b) 3 (c) 1 (d) 4

8 Arrange the following steps:

1 (a) 5 (b) 2 (c) 4 (d) 1 (e) 3
2 (a) 5 (b) 1 (c) 3 (d) 2 (e) 4

9 Give reasons for:

1 It collects information from the environment by the sensory receptors, then sends them to the brain to translate and process information to give a response.
2 Due to the reflex.

Unit 1

Concept 3 Lesson 1

1 Choose the correct answer:

1 c 2 b 3 d 4 b 5 a
6 b 7 d 8 d 9 c

2 Write the scientific term:

1 Nocturnal animals
2 Fishing cats 3 Light energy
4 Light sources 5 The sun
6 Night vision goggles

3 Put (✓) or (✗):

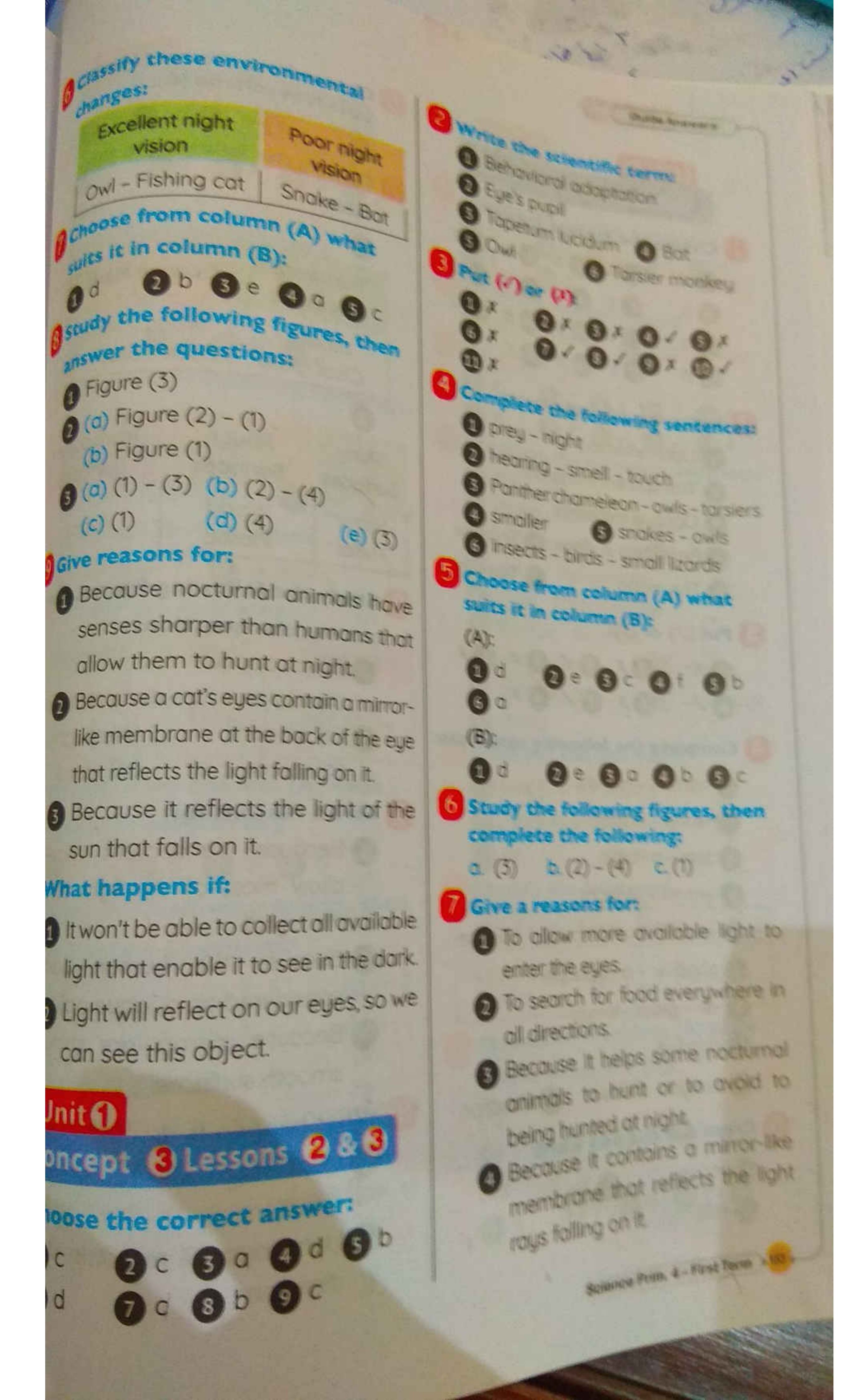
1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✗
6 ✗ 7 ✗ 8 ✓

4 Complete the following sentences:

1 Bats – snakes – owls – fishing cats
2 different 3 light source
4 better
5 night vision goggles
6 back – cats 7 The nervous system

5 Cross out the odd word:

1 Fishing cats 2 Moon



6 Classify these environmental changes:

Excellent night vision	Poor night vision
Owl - Fishing cat	Snake - Bat

7 Choose from column (A) what suits it in column (B):

1 d 2 b 3 e 4 a 5 c

8 Study the following figures, then answer the questions:

1 Figure (3)

2 (a) Figure (2) - (1)
(b) Figure (1)

3 (a) (1) - (3) (b) (2) - (4)
(c) (1) (d) (4) (e) (3)

9 Give reasons for:

1 Because nocturnal animals have senses sharper than humans that allow them to hunt at night.

2 Because a cat's eyes contain a mirror-like membrane at the back of the eye that reflects the light falling on it.

3 Because it reflects the light of the sun that falls on it.

What happens if:

1 It won't be able to collect all available light that enable it to see in the dark.

2 Light will reflect on our eyes, so we can see this object.

Unit 1

Concept 3 Lessons 2 & 3

Choose the correct answer:

1 c 2 c 3 a 4 d 5 b
6 d 7 c 8 b 9 c

2 Write the scientific terms:

1 Behavioral adaptation
2 Eye's pupil
3 Tapetum lucidum 4 Bat
5 Owl 6 Tarsier monkey

3 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✗ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✓ 9 ✗ 10 ✓
11 ✗

4 Complete the following sentences:

1 prey - night
2 hearing - smell - touch
3 Panther chameleon - owls - tarsiers
4 smaller 5 snakes - owls
6 insects - birds - small lizards

5 Choose from column (A) what suits it in column (B):

(A):
1 d 2 e 3 c 4 f 5 b
6 a

(B):
1 d 2 e 3 a 4 b 5 c

6 Study the following figures, then complete the following:

a. (3) b. (2) - (4) c. (1)

7 Give a reasons for:

1 To allow more available light to enter the eyes.

2 To search for food everywhere in all directions.

3 Because it helps some nocturnal animals to hunt or to avoid to being hunted at night.

4 Because it contains a mirror-like membrane that reflects the light rays falling on it.



Unit 1

Concept 3 Lesson 4

1 Choose the correct answer:

1 d 2 b 3 d 4 c 5 c
6 b 7 c 8 d 9 d 10 d
11 b 12 a 13 b 14 b 15 a
16 d 17 c 18 b 19 c

2 Write the scientific term:

1 Light reflection
2 Transparent materials
3 Opaque materials
4 Reflecting surface 5 Shadow
6 The moon 7 The sun

Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✓ 4 ✗ 5 ✗
6 ✓ 7 ✗ 8 ✓ 9 ✗

Complete the following sentences:

1 mirrors – metals
2 wood – papers
3 less – a rough
waves – straight
Wood – human body – opaque
shadow – an opaque
air – glass -lenses
opaque
Rough – diffuse 10 direction

ss out the odd word:

loon 2 Air
ilk

6 Choose from column (A) what suits it in column (B):

1 c 2 e 3 d 4 a 5 b

7 Classify the following in this table:

1

Transparent Mediums	Opaque Mediums
Lenses – Clear glass	Wood – Metal – Book – Skin – Milk

2

Shiny Surfaces	Rough Surfaces	Transparent Surfaces
Mirror Metal	Wood Plastic	Glass

8 Study the following figures, then answer the questions:

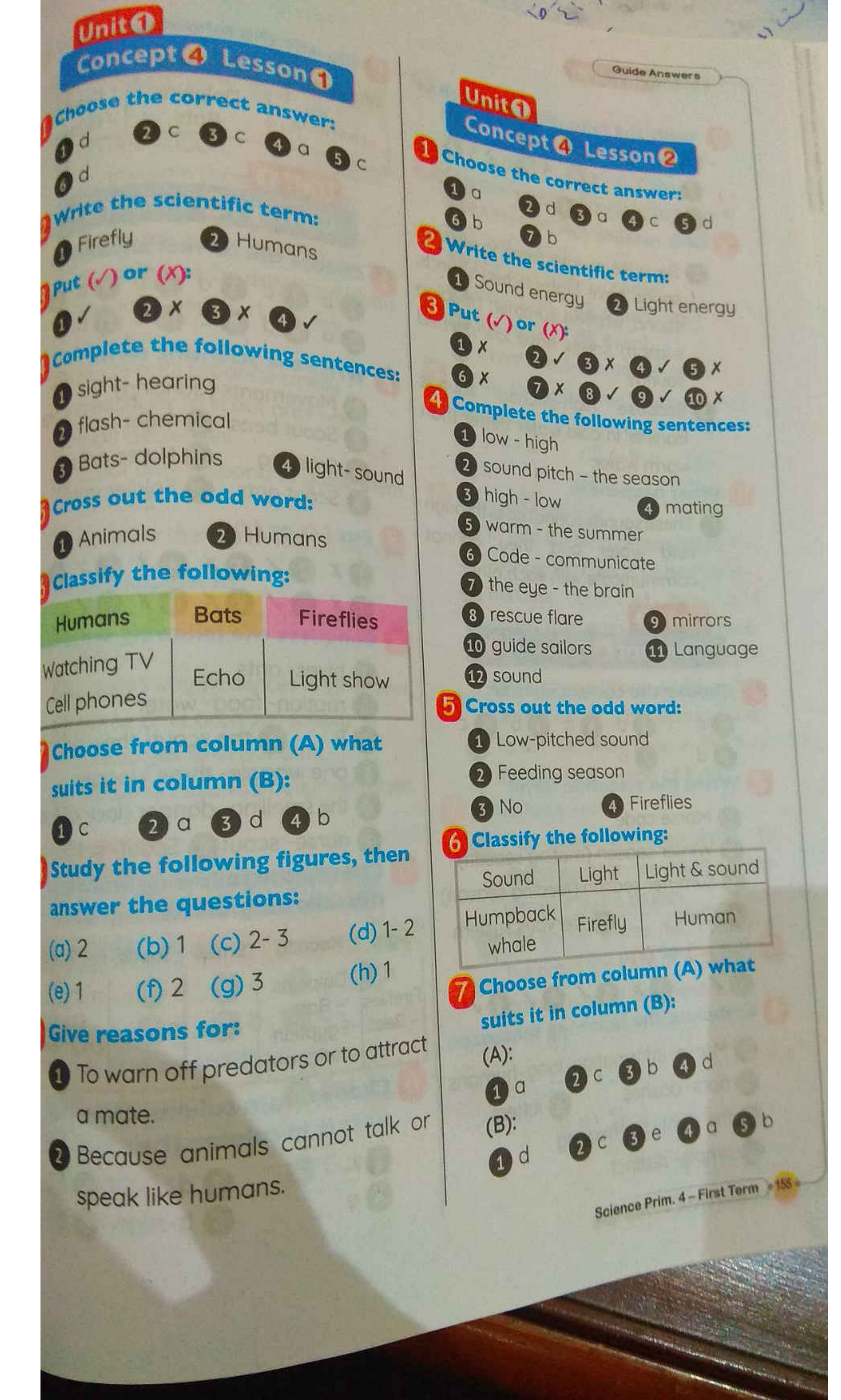
1 (a) an opaque
(b) a light source – opaque materials
2 (a) smooth (b) rough
(c) mirror (d) wood

9 Give a reasons for:

1 Because transparent materials allow most of the light to pass through it.
2 Because the human body is considered an opaque object.
3 Because mirrors are shiny and smooth surfaces.

10 What happen is if:

1 Light rays will reflect in one direction.
2 Light rays will reflect in different directions.



Unit 1

Concept 4 Lesson 1

1 Choose the correct answer:

1 d 2 c 3 c 4 a 5 c
6 d

2 Write the scientific term:

1 Firefly 2 Humans

3 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✓

4 Complete the following sentences:

1 sight- hearing
2 flash- chemical
3 Bats- dolphins 4 light- sound

5 Cross out the odd word:

1 Animals 2 Humans

6 Classify the following:

Humans	Bats	Fireflies
Watching TV Cell phones	Echo	Light show

7 Choose from column (A) what suits it in column (B):

1 c 2 a 3 d 4 b

8 Study the following figures, then answer the questions:

(a) 2 (b) 1 (c) 2- 3 (d) 1- 2
(e) 1 (f) 2 (g) 3 (h) 1

9 Give reasons for:

1 To warn off predators or to attract a mate.
2 Because animals cannot talk or speak like humans.

Unit 1

Concept 4 Lesson 2

1 Choose the correct answer:

1 a 2 d 3 a 4 c 5 d
6 b 7 b

2 Write the scientific term:

1 Sound energy 2 Light energy

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✗
6 ✗ 7 ✗ 8 ✓ 9 ✓ 10 ✗

4 Complete the following sentences:

1 low - high
2 sound pitch - the season
3 high - low 4 mating
5 warm - the summer
6 Code - communicate
7 the eye - the brain
8 rescue flare 9 mirrors
10 guide sailors 11 Language
12 sound

5 Cross out the odd word:

1 Low-pitched sound
2 Feeding season
3 No 4 Fireflies

6 Classify the following:

Sound	Light	Light & sound
Humpback whale	Firefly	Human

7 Choose from column (A) what suits it in column (B):

(A):
1 a 2 c 3 b 4 d

(B):
1 d 2 c 3 e 4 a 5 b

8 Study the following figures, then answer the questions:

1 (a) 2 (b) 3 (c) 1 (d) 4

2 (a) 2 (b) 1 3 (a) 1 (b) 2

9 Give reasons for:

1 Because in winter (mating season): songs have high-pitched sounds. sound, while in summer: (feeding season) songs have low-pitched sounds.

2 Because high-pitched sounds transfer in cold water better than warm water.

10 What happens if:

- These sounds cannot pass through cold water and they cannot communicate with each other.

Unit 1

Concept 4 Lesson 3

1 Choose the correct answer:

1 c 2 d 3 a 4 b 5 c
6 d 7 b

Write the scientific term:

1 Morse code
2 Winter season (mating season)
3 Summer season (feeding season)
4 Code 5 Nervous system

Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✓ 5 ✓

Complete the following sentences:

1 Morse- information- long- humans
2 dots- dashes 3 letters
4 the sight- the hearing
5 simple- distinct

5 Classify the following:

Morse code	Echolocation	Light Show
Humans	Dolphins Bats	Fireflies Human

Unit 1

Concept 4 Lesson 4

1 Choose the correct answer:

1 b 2 c 3 d 4 b 5 a 6 b
7 a 8 d 9 c 10 b 11 b

2 Write the scientific term:

1 Movements (dancing)
2 Scout bees 3 Sight
4 Smelling 5 Nurse ants
6 Scout ants 7 Soldier ants

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓ 6 ✗
7 ✗ 8 ✓ 9 ✗ 10 ✗ 11 ✓

4 Complete the following sentences:

1 hives- ants
2 motion- food- water
3 8 4 the scout- their sight
5 one waggle- three waggle
6 the smelling- danger (lack of food)
7 nurse- scout 8 Scout- soldier

5 Classify the following words in the following table:

Sight	Hearing	Smell	Touch	Taste
Fireflies - Bees	Dolphins - Bats - Egyptian mongoose	Ants	Snakes	Panther chameleons

6 Choose from column (A) what suits it in column (B):

1 c 2 d 3 f
4 e 5 b 6 a

Study the following figures, then answer the questions:

1. (a) 1 (b) 3 (c) 3 (d) 4 (e) 1-2 (f) 1
2. (a) one waggle (b) 3 waggle (c) translate (interpret)- sight

Give reasons for:

1. To tell the other bees about the distance and the direction of food.
2. Because they can't talk like humans.
3. Nurse ants produce smelly messages to scout ants when food decreases.
4. Scout ants respond to guide them for food.
5. Because there is a nearby danger.

What happens if:

1. It does one waggle dance to other bees.
2. It does 3 waggle dances to other bees.
3. Nurse ants produce smelly messages to scout ants.
4. Soldier ants send smelly messages.

Unit 1

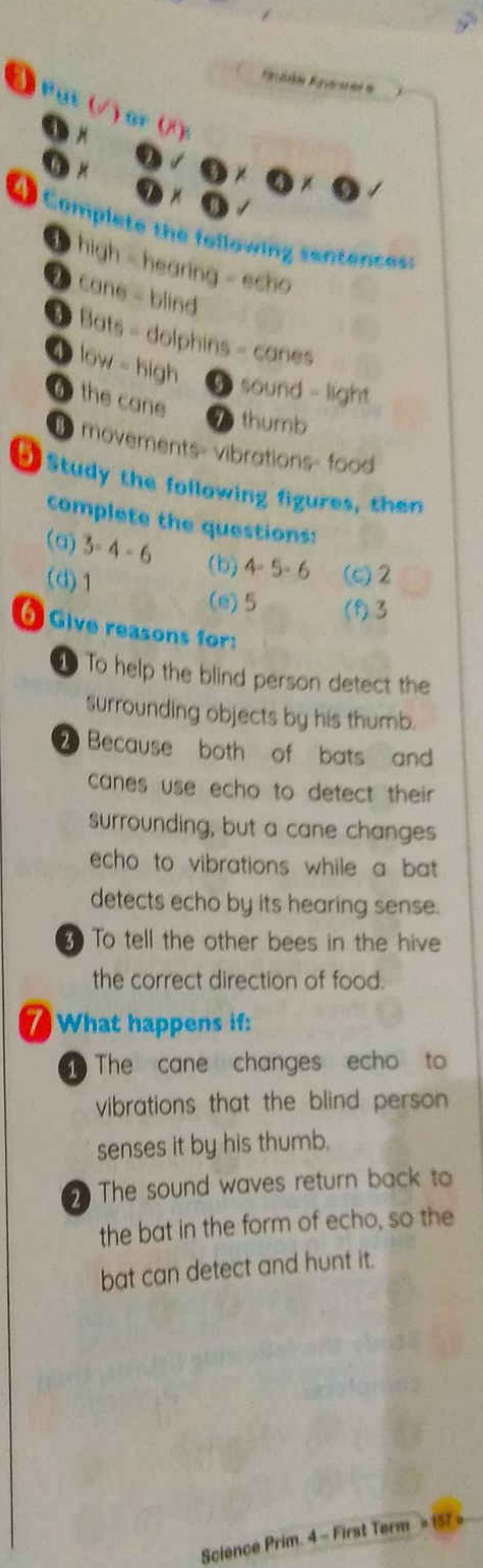
Concept 4 Lesson 5

1 Choose the correct answer:

1 c 2 d 3 c 4 d 5 b
6 c 7 d 8 b 9 c

2 Write the scientific term:

1. Echolocation
2. Bat
3. Touching sense
4. Hearing sense
5. Cane
6. Honeybee



3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓
6 ✗ 7 ✗ 8 ✓

4 Complete the following sentences:

1. high - hearing - echo
2. cane - blind
3. Bats - dolphins - canes
4. low - high
5. sound - light
6. the cane
7. thumb
8. movements- vibrations- food

5 Study the following figures, then complete the questions:

(a) 3- 4 - 6 (b) 4- 5- 6 (c) 2
(d) 1 (e) 5 (f) 3

6 Give reasons for:

1. To help the blind person detect the surrounding objects by his thumb.
2. Because both of bats and canes use echo to detect their surrounding, but a cane changes echo to vibrations while a bat detects echo by its hearing sense.
3. To tell the other bees in the hive the correct direction of food.

7 What happens if:

1. The cane changes echo to vibrations that the blind person senses it by his thumb.
2. The sound waves return back to the bat in the form of echo, so the bat can detect and hunt it.

Unit 2

Concept 1 Lesson 1

1 Choose the correct answer:

1 d 2 d 3 c 4 d 5 d
6 c 7 b 8 c 9 b 10 d
11 b 12 c

2 Write the scientific term:

1 Static object 2 Pushing force
3 Pulling force 4 Shockwave truck
5 Pushing force 6 Parachute

Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✓ 4 ✗ 5 ✗
6 ✓ 7 ✗ 8 ✓ 9 ✓ 10 ✗

Complete the following sentences:

1 push – pull
2 static – force – position
3 position 4 energy
5 Pushing 6 Pushing – an engine
7 more
8 a normal truck – rockets
9 three – five 10 Parachutes

ross out the odd word:

1 Time 2 Lifting a bag
3 Pulling force 4 Normal truck

oose from column (A) what ts it in column (B):

c 2 e 3 b 4 d

dy the following figures, then nplete:

(4) - (1) 2 (2)
2) - (4) 4 (2) - (3)

8 Study the following figures, then mention the kind of force:

1 Pushing 2 Pulling
3 Pushing 4 Pulling

9 Give reasons for:

1 Because pushing force means that you move the objects away from you, while pulling force means that you move the objects toward you.
2 Because when you kick the ball, it moves away from you.
3 Because when you lift the bag, it moves toward you.
4 Because jet air plane's engines are more powerful than normal trucks.
5 Because Shockwave truck is fitted with three jet engines.
6 Because parachutes help to decrease the speed of the Shockwave truck.

10 What happens if:

1 The state of the object will change and the object will change its position.
2 The speed of the Shockwave truck will decrease.

Unit 2

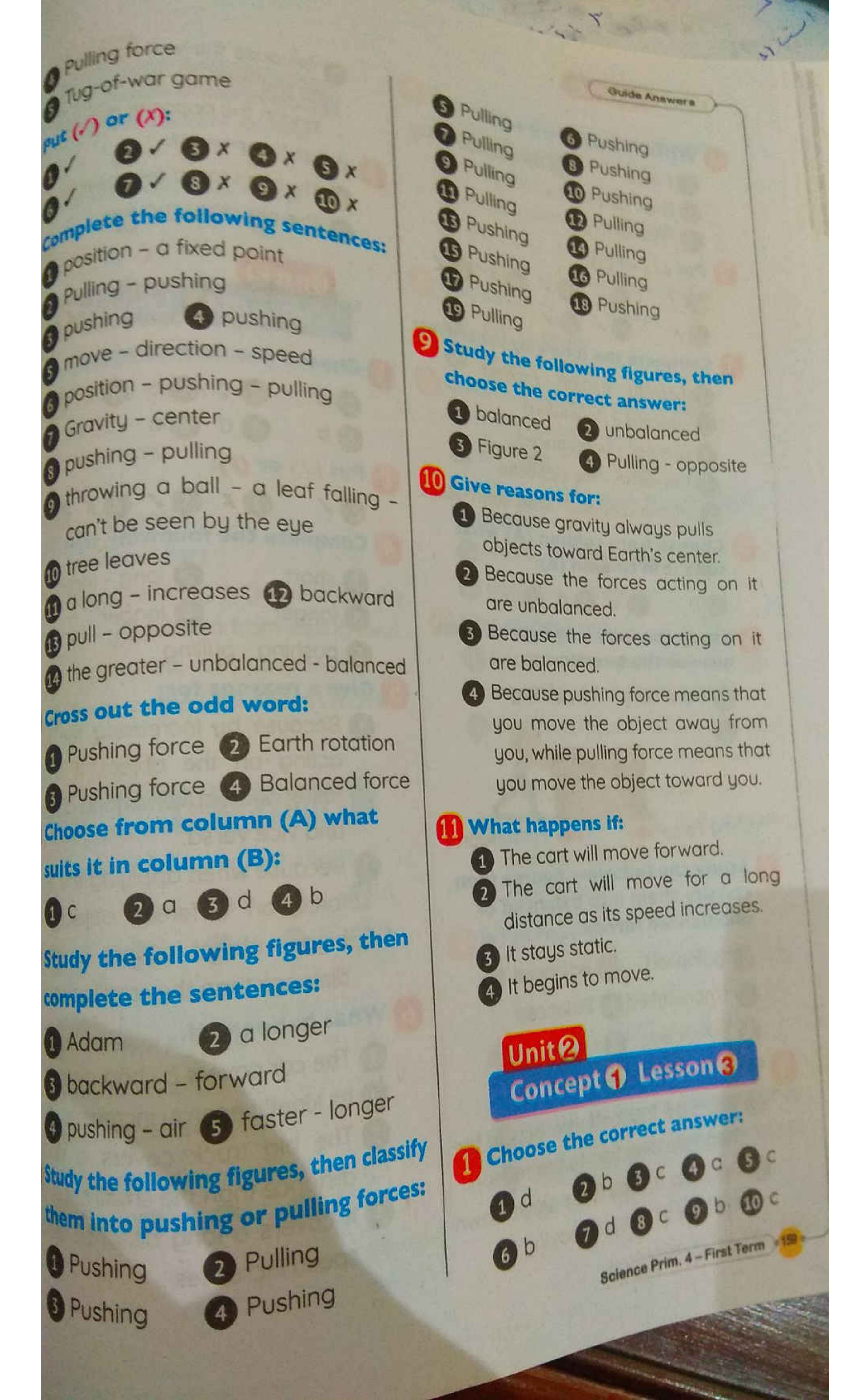
Concept 1 Lesson 2

1 Choose the correct answer:

1 d 2 b 3 c 4 b 5 b
6 c 7 b 8 c 9 d 10 c

2 Write the scientific term:

1 Motion 2 Gravity
3 Pushing force



8. Pulling force
9. Tug-of-war game

Put (✓) or (✗):

1. ✓ 2. ✓ 3. ✗ 4. ✗ 5. ✗
6. ✓ 7. ✓ 8. ✗ 9. ✗ 10. ✗

Complete the following sentences:

1. position – a fixed point
2. Pulling – pushing
3. pushing 4. pushing
5. move – direction – speed
6. position – pushing – pulling
7. Gravity – center
8. pushing – pulling
9. throwing a ball – a leaf falling – can't be seen by the eye
10. tree leaves
11. a long – increases 12. backward
13. pull – opposite
14. the greater – unbalanced - balanced

Cross out the odd word:

1. Pushing force 2. Earth rotation
3. Pushing force 4. Balanced force

Choose from column (A) what suits it in column (B):

1. c 2. a 3. d 4. b

Study the following figures, then complete the sentences:

1. Adam 2. a longer
3. backward – forward
4. pushing – air 5. faster - longer

Study the following figures, then classify them into pushing or pulling forces:

1. Pushing 2. Pulling
3. Pushing 4. Pushing
5. Pulling 6. Pushing
7. Pulling 8. Pushing
9. Pulling 10. Pushing
11. Pulling 12. Pulling
13. Pushing 14. Pulling
15. Pushing 16. Pulling
17. Pushing 18. Pushing
19. Pulling

9 Study the following figures, then choose the correct answer:

1. balanced 2. unbalanced
3. Figure 2 4. Pulling - opposite

10 Give reasons for:

1. Because gravity always pulls objects toward Earth's center.
2. Because the forces acting on it are unbalanced.
3. Because the forces acting on it are balanced.
4. Because pushing force means that you move the object away from you, while pulling force means that you move the object toward you.

11 What happens if:

1. The cart will move forward.
2. The cart will move for a long distance as its speed increases.
3. It stays static.
4. It begins to move.

Unit 2 Concept 1 Lesson 3

1 Choose the correct answer:

1. d 2. b 3. c 4. a 5. c
6. b 7. d 8. c 9. b 10. c



2 Write the scientific term:

1. Force
2. Unbalanced forces
3. Balanced forces
4. Friction force

3 Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✓ 4 ✗ 5 ✓
6 ✗ 7 ✗ 8 ✓

4 Complete the following sentences:

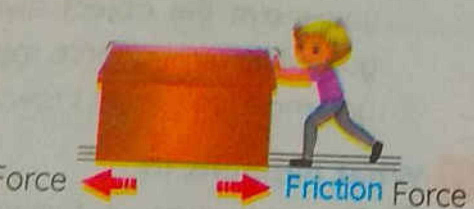
1. Gravity - friction - motion
2. upward - downward
3. greater - unbalanced
4. the same - the opposite
5. Friction - opposite - slows down - stops

5 Choose from column (A) what suits it in column (B):

1 b 2 c 3 d 4 a

6 Study the following figures, then answer the questions:

1. (a) pulling (b) pushing
2.



Study the following figures then classify them into balanced or unbalanced forces:

1 Balanced 2 Balanced
3 Unbalanced 4 Balanced
5 Balanced 6 Unbalanced

ive reasons for:

Because friction force acts in the opposite direction to the motion.

Because friction force slows down the bike till it stops moving.

3. Because the wall applied a force to the car with the same amount and in the opposite direction.

9 What happens if:

1. The bike's speed decreases till it stops.
2. The car stops moving.

Unit 2

Concept 1 Lesson 4

1 Choose the correct answer:

1 d 2 c 3 b 4 c 5 d
6 b 7 d 8 a

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✗

4 Complete the following sentences:

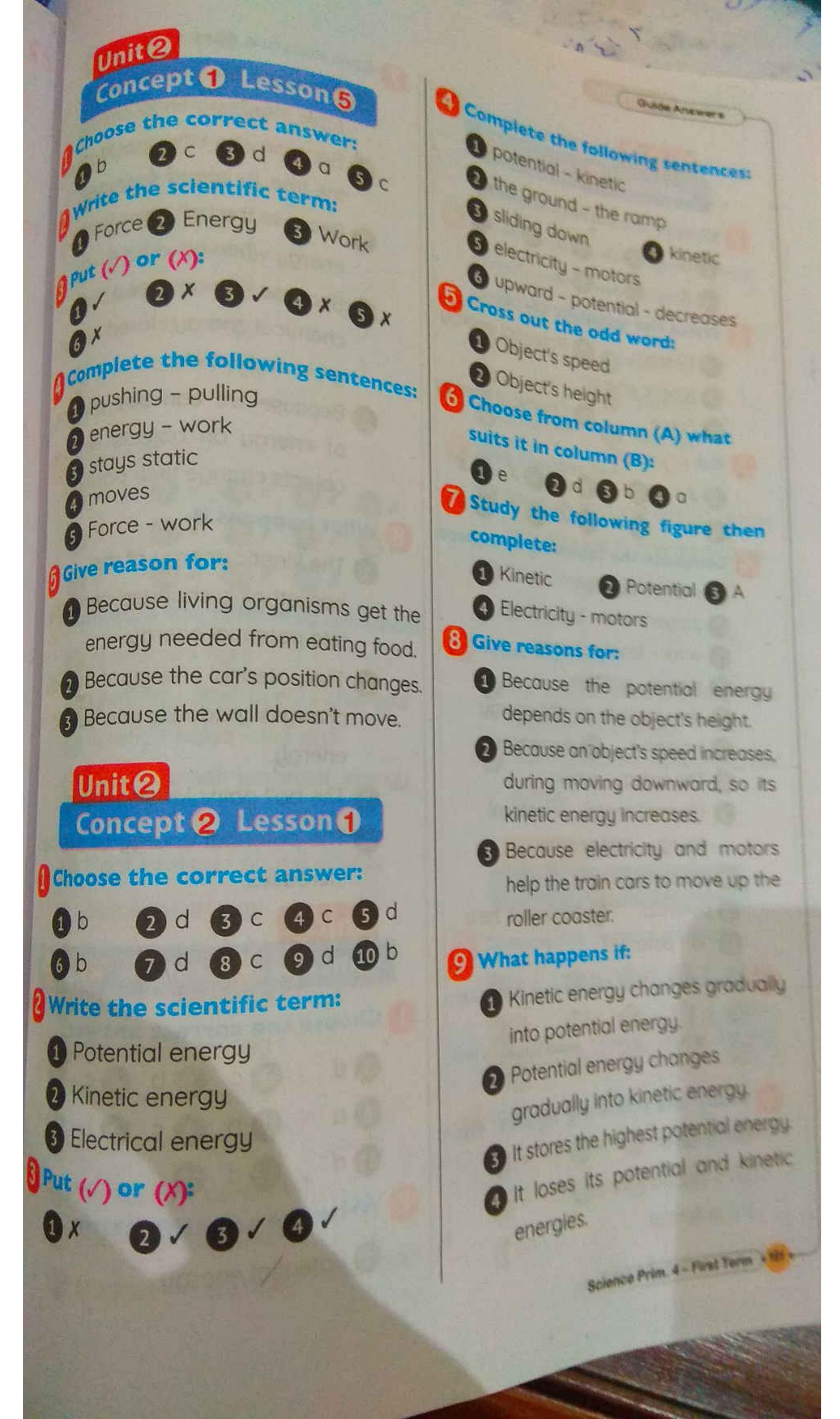
1. short
2. long - increases
3. longer
4. longer
5. pushing - pulling

5 Give a reasons for:

1. Because by increasing the force acting on the object, it moves faster and it covers a long distance and vice versa.
2. Because when applying the same force on different objects, the bigger object covers a shorter distance than the small object.

6 What happens if:

1. The car covers a short distance.
2. Its kinetic energy increases.
3. The big truck covers a shorter distance than the small car.
4. It covers a long distance and its speed increases.



Unit 2

Concept 1 Lesson 5

1 Choose the correct answer:

1 b 2 c 3 d 4 a 5 c

2 Write the scientific term:

1 Force 2 Energy 3 Work

3 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✗
6 ✗

4 Complete the following sentences:

1 pushing - pulling
2 energy - work
3 stays static
4 moves
5 Force - work

5 Give reason for:

1 Because living organisms get the energy needed from eating food.
2 Because the car's position changes.
3 Because the wall doesn't move.

Unit 2

Concept 2 Lesson 1

1 Choose the correct answer:

1 b 2 d 3 c 4 c 5 d
6 b 7 d 8 c 9 d 10 b

2 Write the scientific term:

1 Potential energy
2 Kinetic energy
3 Electrical energy

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓

4 Complete the following sentences:

1 potential - kinetic
2 the ground - the ramp
3 sliding down 4 kinetic
5 electricity - motors
6 upward - potential - decreases

5 Cross out the odd word:

1 Object's speed
2 Object's height

6 Choose from column (A) what suits it in column (B):

1 e 2 d 3 b 4 a

7 Study the following figure then complete:

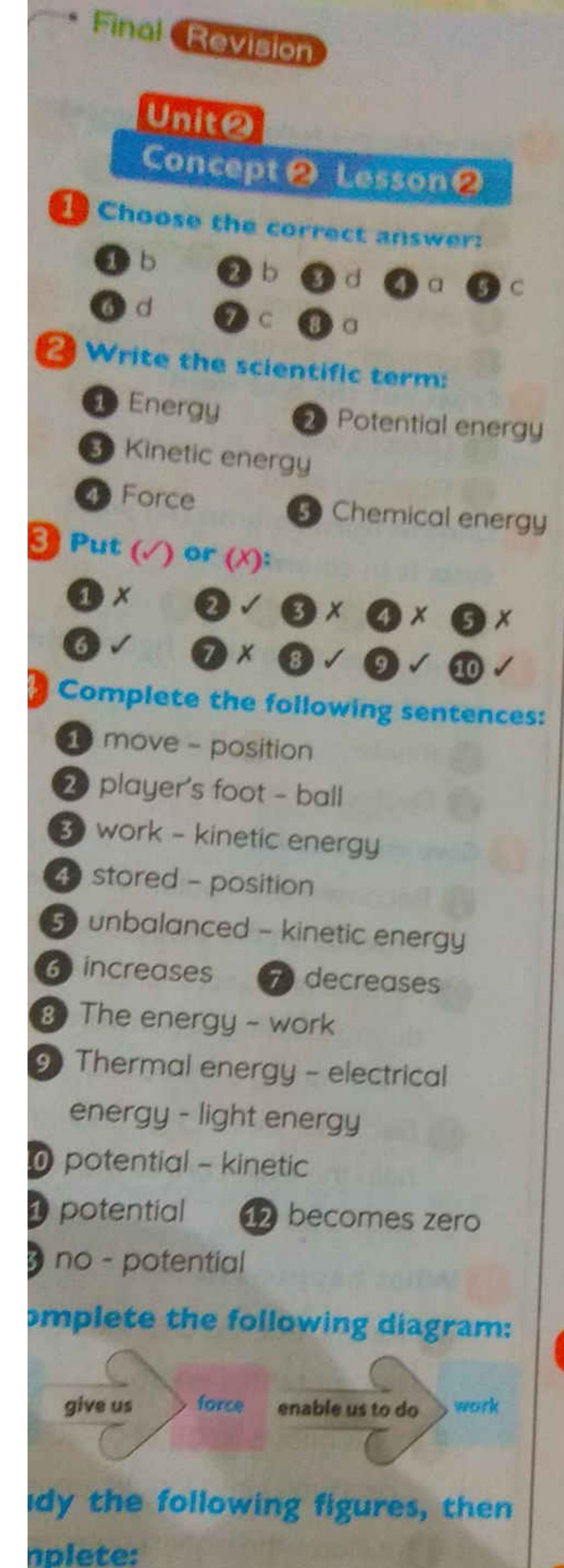
1 Kinetic 2 Potential 3 A
4 Electricity - motors

8 Give reasons for:

1 Because the potential energy depends on the object's height.
2 Because an object's speed increases during moving downward, so its kinetic energy increases.
3 Because electricity and motors help the train cars to move up the roller coaster.

9 What happens if:

1 Kinetic energy changes gradually into potential energy.
2 Potential energy changes gradually into kinetic energy.
3 It stores the highest potential energy.
4 It loses its potential and kinetic energies.



Unit 2

Concept 2 Lesson 2

1 Choose the correct answer:

1 b 2 b 3 d 4 a 5 c
6 d 7 c 8 a

2 Write the scientific term:

1 Energy 2 Potential energy
3 Kinetic energy
4 Force 5 Chemical energy

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✗
6 ✓ 7 ✗ 8 ✓ 9 ✓ 10 ✓

4 Complete the following sentences:

1 move - position
2 player's foot - ball
3 work - kinetic energy
4 stored - position
5 unbalanced - kinetic energy
6 increases 7 decreases
8 The energy - work
9 Thermal energy - electrical energy - light energy
10 potential - kinetic
11 potential 12 becomes zero
13 no - potential

omplete the following diagram:

dy the following figures, then nplete:

potential - kinetic

potential (c) no

7 Give reasons for:

1 Becauses the static book on the table stores potential energy.
2 Because when the apple falls from the tree, its speed increases.
3 Because the ball gains kinetic energy when you kick it.
4 Because humans need the chemical energy stored in food to grow and move.
5 Because we can see the effect of energy on objects when the objects change their positions.

8 What happens if:

1 The kinetic energy of the basketball is changed gradually into potential energy.
2 The potential energy of the book changes gradually into Kinetic energy.
3 The ball gains kinetic energy.
4 The potential energy of the book increases.

Unit 2

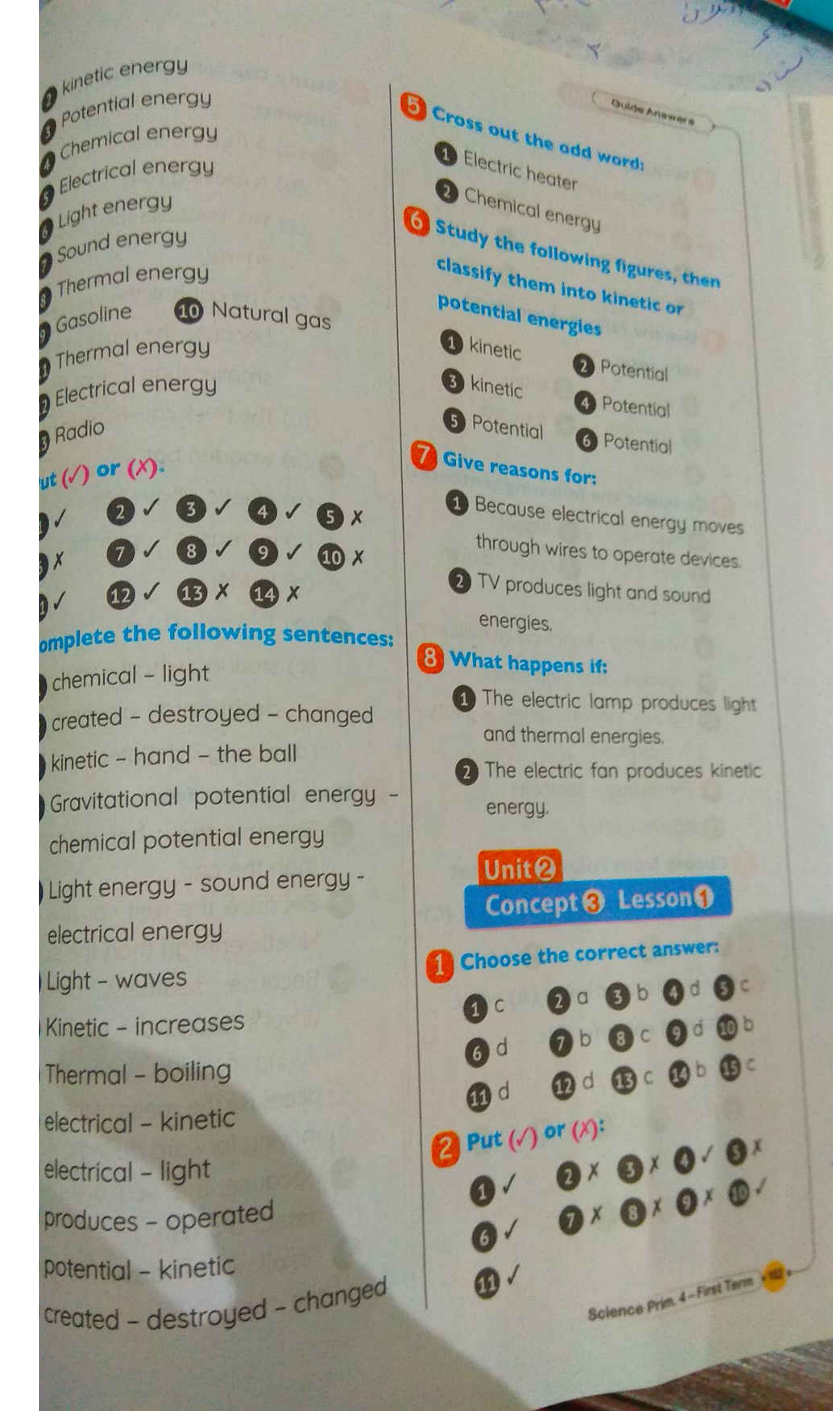
Concept 2 Lessons 3 & 4

1 Choose the correct answer:

1 d 2 c 3 b 4 c 5 d
6 a 7 b 8 c 9 b 10 c
11 d 12 d 13 c

2 Write the scientific term:

1 Potential energy



2 kinetic energy
3 Potential energy
4 Chemical energy
5 Electrical energy
6 Light energy
7 Sound energy
8 Thermal energy
9 Gasoline 10 Natural gas
11 Thermal energy
12 Electrical energy
13 Radio

Put (✓) or (✗).

1 ✓ 2 ✓ 3 ✓ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✓ 9 ✓ 10 ✗
11 ✓ 12 ✓ 13 ✗ 14 ✗

Complete the following sentences:

- chemical – light
- created – destroyed – changed
- kinetic – hand – the ball
- Gravitational potential energy - chemical potential energy
- Light energy - sound energy - electrical energy
- Light – waves
- Kinetic – increases
- Thermal – boiling
- electrical – kinetic
- electrical – light
- produces – operated
- potential – kinetic
- created – destroyed – changed

5 Cross out the odd word:

1 Electric heater
2 Chemical energy

6 Study the following figures, then classify them into kinetic or potential energies

1 kinetic 2 Potential
3 kinetic 4 Potential
5 Potential 6 Potential

7 Give reasons for:

1 Because electrical energy moves through wires to operate devices.
2 TV produces light and sound energies.

8 What happens if:

1 The electric lamp produces light and thermal energies.
2 The electric fan produces kinetic energy.

Unit 2
Concept 3 Lesson 1

1 Choose the correct answer:

1 c 2 a 3 b 4 d 5 c
6 d 7 b 8 c 9 d 10 b
11 d 12 d 13 c 14 b 15 c

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✓ 5 ✗
6 ✓ 7 ✗ 8 ✗ 9 ✗ 10 ✓
11 ✓

3 Write the scientific term:

1. Cricket game
2. Wrecking ball
3. Nylon
4. Car sensor
5. Airbag
6. Seatbelt
7. Airbag

4 Use the following words to complete:

1. less
2. more
3. opposite
4. forward
5. nylon

5 Complete the following sentences:

1. energy
2. bigger
3. less
4. a car - a train
5. Fast - heavy
6. Wrecking - knock down buildings
7. wooden - ball - increases
8. nylon - steering wheel - seats - dashboard
9. The airbag - seatbelts
10. inflates - after

6 Choose from column (A) what suits it in both columns (B) & (C):

1. b-c
2. a-b
3. c-a

7 Choose from column (A) what suits it in column (B):

(A):

1. c
2. e
3. a
4. d
5. b

(B):

1. e
2. b
3. d

8 Study the following figures, then answer:

1. (a) A moving train
   (b) A moving bike
   (c) Yes, because they have kinetic energy.
2. (a) The car has the lowest energy because the mass of the car is smaller than that of the truck.
   (b) The truck causes more damage.
3. (a) wooden bat
   (b) kinetic - bat - ball
   (c) increases - opposite
   (d) louder
4. (a) 1 (b) 2
   (c) steering wheel - seat - dashboard - a sensor
   (d) during - deflates

9 Give reasons for:

1. Because truck has greater mass than the car.
2. Because the fast car has greater kinetic energy than the slow car.
3. Because seatbelts prevent the driver's body from moving forward during collision, while the airbags decrease the speed of the driver while moving forward during collision.
4. Because the sensors of the car detect a crash.
5. To allow the driver to get out of the car.

What happens if:

1. Kinetic energy transfers from the heavy object to the light object and it causes more damage.
2. Kinetic energy transfers from the fast object to the slow object and it causes more damage.
3. Energy transfers from the bat to the ball and the speed of the ball increases in the opposite direction.

Unit 2

Concept 3 Lesson 2

Choose the correct answer:

1 d 2 c 3 a 4 c 5 a
6 b 7 c 8 c 9 c 10 d
11 b 12 d 13 d 14 c 15 d
16 c 17 d 18 b 19 a 20 b

Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓
6 ✗ 7 ✓ 8 ✗ 9 ✓ 10 ✗
11 ✗ 12 ✓ 13 ✗ 14 ✗ 15 ✗

Write the scientific term:

1. Collision
2. Kinetic energy
3. Speed
4. Meter (kilometer)
5. Second (hour)
6. Meter/second (Kilometer/hour)

Complete the following sentences:

1. vibrates- boy- traffic sign- sound- thermal
2. distance- time
3. meter- kilometer
4. second- hour
5. Meter/second- kilometer/hour
6. 3 m/sec
7. faster
8. more
9. fast-slow
10. the mass of the object - the speed of the object
11. faster
12. decreasing

5 Cross out the odd word:

1. Kg
2. Distance

6 Choose from column (A) what suits it in column (B):

1 d 2 a 3 b 4 c

7 Which object moves faster:

1. Car (A)
2. Car (B)

8 Study the following table then complete:

1. B- D
2. A- C

9 Study the following figures then answer the questions:

1. (a) car- traffic sign
   (b) car- bike (c) sound energy
2. Figure 1 causes more severe damage because the cars collide in the opposite directions.
3. (a) slower- decreases.
   (b) faster- increases.

10 Give reasons for:

1. Because the fast object has high speed, while the slow object has low speed.

2. Because during collision, kinetic energy transfers between the two objects also sound and thermal energies are produced.
3. Because when the speed of the object increases, its kinetic energy increases, and the force of collision increases along with the damage.

1 What happens if:

1. Transfer of energy occurs, sound and thermal energies are produced.
2. Its speed increases.
3. Its speed decreases.
4. The damage of collision becomes more severe.
5. The damage of collision becomes less severe.
6. Kinetic energy will decrease.

Unit 2

Concept 3 Lesson 4

1 Choose the correct answer:

1 c 2 c 3 d 4 c 5 b
6 a 7 b 8 c 9 b 10 c

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✗

3 Complete the following sentences:

1. force
2. slower
3. engine
4. Kinetic
5. less
6. damage
7. changes much more
8. lightly- strongly.

4 Choose from column (A) what suits it in column (B):

1 d 2 a 3 b

5 Study the following figures, then answer the questions:

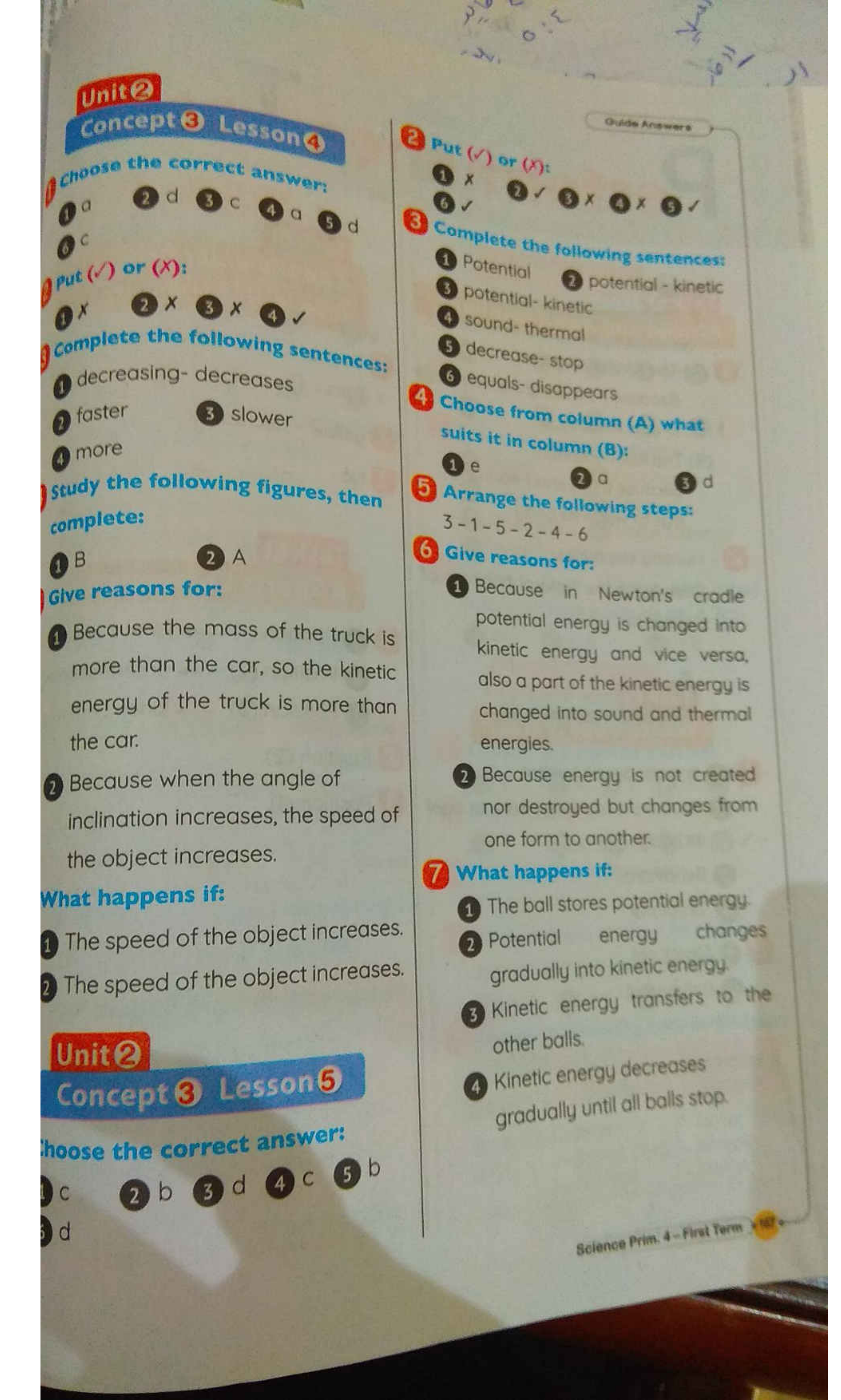
(a) 2 (b) 1 (c) 3
(d) 3- 2 (e) 3- 1

6 Give reasons for:

1. Because the heavy object has a big engine and consumes more fuel.
2. Because the mass of the truck is bigger than the mass of the car

7 What happens if:

1. Kinetic energy increases.
2. Kinetic energy increases.
3. He may be injured only and survive.
4. His life may be in danger.



Unit 2

Concept 3 Lesson 4

1 Choose the correct answer:

1 a 2 d 3 c 4 a 5 d
6 c

2 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✗ 4 ✓

3 Complete the following sentences:

1 decreasing- decreases
2 faster 3 slower
4 more

4 Study the following figures, then complete:

1 B 2 A

5 Give reasons for:

1 Because the mass of the truck is more than the car, so the kinetic energy of the truck is more than the car.
2 Because when the angle of inclination increases, the speed of the object increases.

6 What happens if:

1 The speed of the object increases.
2 The speed of the object increases.

Unit 2

Concept 3 Lesson 5

1 Choose the correct answer:

1 c 2 b 3 d 4 c 5 b
6 d

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓
6 ✓

3 Complete the following sentences:

1 Potential 2 potential - kinetic
3 potential- kinetic
4 sound- thermal
5 decrease- stop
6 equals- disappears

4 Choose from column (A) what suits it in column (B):

1 e 2 a 3 d

5 Arrange the following steps:

3 - 1 - 5 - 2 - 4 - 6

6 Give reasons for:

1 Because in Newton's cradle potential energy is changed into kinetic energy and vice versa, also a part of the kinetic energy is changed into sound and thermal energies.
2 Because energy is not created nor destroyed but changes from one form to another.

7 What happens if:

1 The ball stores potential energy.
2 Potential energy changes gradually into kinetic energy.
3 Kinetic energy transfers to the other balls.
4 Kinetic energy decreases gradually until all balls stop.

Performance Tasks

Task 1
African and Asian Elephants

1. (A) The African elephant
   Because it has long ears and legs to cool its body.
   (B) The Asian elephant
   Because it has short ears and legs to warm its body.
2. - Hunting elephants.
   - Destroying the natural habitats of elephants.

Task 2
Where Does It Live?

1. 1. In a hot desert habitat.
   2. Because it has large ears to cool its body.
   3. Behavioral
   4. Structural
   1. Structural
   2. Behavioral

Task 3
Can the Polar Bear Live in Hot Habitat?

1. Because it has thick fur and small ears.
2. yellow – decreases
3. No

Task 4
A Sports Competition

1. 1. Position (1) ⟶ kinetic energy
   2. Position (2) ⟶ potential energy
   3. Position (3) ⟶ kinetic energy
2. Position (2).
3. Position (1).

Concept Exams

Model Exam A

Unit (1) Concept (1)

1 Choose the correct answer:

1 b 2 d 3 d 4 b 5 d

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✗

3 What is the kind of adaptation in the following examples:

1. Structural adaptation
2. Behavioral adaptation
3. Structural adaptation
4. Behavioral adaptation
5. Behavioral adaptation

4 Compare between the two following processes:

P.O.C	Inhalation	Exhalation
Diaphragm	Contracts (Moves down)	Relaxes (Moves up)
Chest Size	Increases	Decreases
Air Rich in	Oxygen	Carbon dioxide

5 Classify these organs according to the system they belong to:

Respiratory System	Digestive System
- Pharynx - Diaphragm - Trachea - Nose - Lungs - Alveoli	- Pharynx - Stomach - Liver - Anus - Tongue - Liver - Small intestine

Model Exam B

Unit (1) Concept (1)

1 Choose the correct answer:

1 b 2 c 3 b 4 b 5 c

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✗

3 Label the following figure:

1 Mouth 2 Esophagus
3 Liver 4 Stomach
5 Pancreas 6 Large intestine
7 Small intestine

4 Choose from column (A) what suits it in both columns (B) & (C):

1 b-c 2 c-a 3 a-b

Model Exam A

Unit (1) Concept (2)

1 Choose the correct answer:

1 d 2 c 3 b 4 d 5 b

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓

3 Arrange the following:

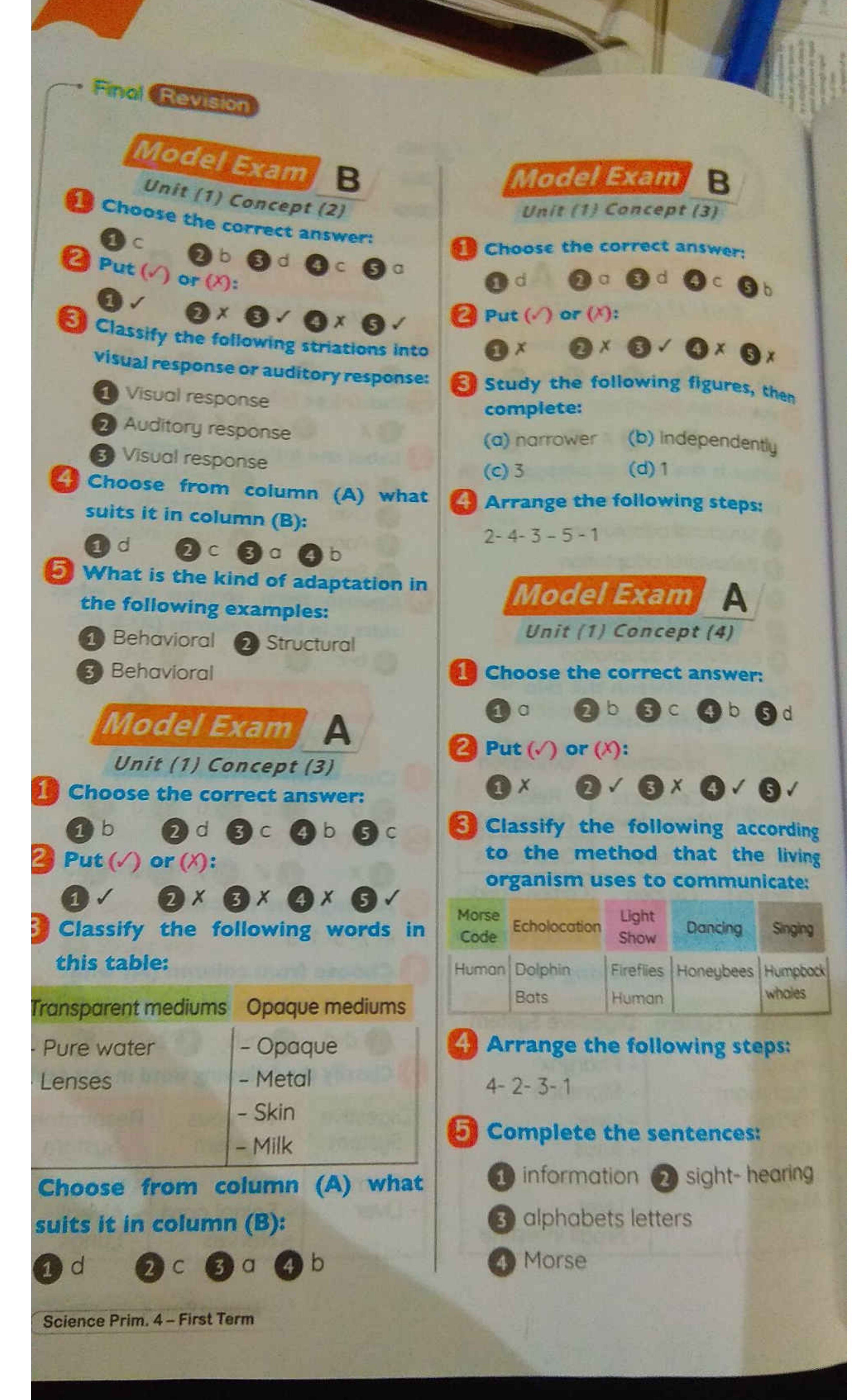
4- 2- 5- 1- 3

4 Choose from column (A) what suits it in both columns (B) & (C):

1 d-d 2 a-b 3 b-a 4 c-c

5 Classify the following word in this table:

Digestive System	Nervous system	Respiratory System
- Stomach - Liver	- Brain - Spinal cord - Nerves	- Nose - Alveoli - Lungs



Model Exam B

Unit (1) Concept (2)

1 Choose the correct answer:

1 c 2 b 3 d 4 c 5 a

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✓

3 Classify the following striations into visual response or auditory response:

1 Visual response

2 Auditory response

3 Visual response

4 Choose from column (A) what suits it in column (B):

1 d 2 c 3 a 4 b

5 What is the kind of adaptation in the following examples:

1 Behavioral 2 Structural

3 Behavioral

Model Exam A

Unit (1) Concept (3)

1 Choose the correct answer:

1 b 2 d 3 c 4 b 5 c

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓

3 Classify the following words in this table:

Transparent mediums	Opaque mediums
- Pure water - Lenses	- Opaque - Metal - Skin - Milk

Choose from column (A) what suits it in column (B):

1 d 2 c 3 a 4 b

Model Exam B

Unit (1) Concept (3)

1 Choose the correct answer:

1 d 2 a 3 d 4 c 5 b

2 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✓ 4 ✗ 5 ✗

3 Study the following figures, then complete:

(a) narrower (b) independently

(c) 3 (d) 1

4 Arrange the following steps:

2- 4- 3 - 5 - 1

Model Exam A

Unit (1) Concept (4)

1 Choose the correct answer:

1 a 2 b 3 c 4 b 5 d

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✓

3 Classify the following according to the method that the living organism uses to communicate:

Morse Code	Echolocation	Light Show	Dancing	Singing
Human	Dolphin Bats	Fireflies Human	Honeybees	Humpback whales

4 Arrange the following steps:

4- 2- 3- 1

5 Complete the sentences:

1 information 2 sight- hearing

3 alphabets letters

4 Morse

Model Exam B

Unit (1) Concept (4)

1 Choose the correct answer:

1 b 2 c 3 d 4 b 5 b

2 Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✓ 4 ✓ 5 ✗

3 Study the following figures, then complete:

1 (3) - ant 2 (2) - firefly

3 (1) - honeybee

4 (4) -humpback whale

4 Choose from column (A) what suits it in both columns (B) & (C):

1 b-c 2 c-a 3 a-b

Model Exam A

Unit (2) Concept (1)

1 Choose the correct answer:

1 b 2 d 3 c 4 a 5 d

2 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✗ 4 ✗ 5 ✗

3 Study the following figures, then classify them into balanced or unbalanced forces:

1 Balanced 2 Balanced

3 Unbalanced 4 Unbalanced

4 Choose from column (A) what suits it in column (B):

1 c 2 a 3 d 4 b

Model Exam B

Unit (2) Concept (1)

1 Choose the correct answer:

1 b 2 b 3 b 4 c 5 b

2 Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✓

3 Choose from column (A) what suits it in column (B):

1 b 2 c 3 d 4 a

4 Study the following figures, then classify them into pushing or pulling forces:

1 Pushing force 2 Pushing force

3 Pulling force 4 Pulling force

Model Exam A

Unit (2) Concept (2)

1 Choose the correct answer:

1 b 2 d 3 d 4 a 5 c

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✓ 5 ✓

3 Complete the following diagram:

Energy - work

4 Study the following figures, then classify them into kinetic or potential energies:

1 Kinetic 2 Kinetic

3 Potential and kinetic 4 Potential

5 Potential

5 Study the following figure, then put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✓

Model Exam B

Unit (2) Concept (2)

1 Choose the correct answer:

1 c 2 b 3 c 4 c 5 b

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✓ 5 ✓

3 Study the following figure, then compete:

1 potential 2 kinetic- potential

3 no

4 Choose from column (A) what suits it in column (B):

1 d 2 c 3 b

Model Exam A

Unit (2) Concept (3)

Choose the correct answer:

1 b 2 d 3 c 4 a 5 c

Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓

Speed = distance ÷ time

= 600 m ÷ 150 sec = 4 m/sec

Arrange the following objects from faster to slower:

- 3 - 2

What happens if:

1 Its mass remains constant, while its kinetic energy increases

2 The person may be injured only and survive.

Model Exam B

Unit (2) Concept (3)

1 Choose the correct answer:

1 c 2 b 3 b 4 a 5 d

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓

3 Which object moves faster:

Speed of car (A) = distance ÷ time

= 500 ÷ 10 = 50 m/sec.

Speed of car (B) = distance ÷ time

= 600 ÷ 20 = 30 m/sec.

Car (A) is faster.

4 Choose from column (A) what suits it in column (B):

1 c 2 a 3 b

5 What happens if:

- During collision, kinetic energ transfers and a part of the kineti energy changes into sound an thermal energies.

Model Exams

Model Exam 1

1 Choose the correct answer:

1 c 2 d 3 b 4 d 5 b

2 Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✗

3 Speed = distance ÷ time = 600 ÷ 6
= 100 km/hr.

4 Which of the following surfaces represents the reflection of light rays from a wooden spoon and why?

(B), because light rays reflect in different directions when they fall on a rough surface.

Model Exam 2

1 Choose the correct answer:

1 c 2 d 3 a 4 b 5 d

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓

3 Car (B) has higher speed because it covers a longer distance at the same time.

4 Label the following two processes, then answer the questions:

(A): inhalation (B): exhalation

1 It contracts and moves down.

2 It decreases.

Model Exam 3

1 Choose the correct answer:

1 b 2 c 3 d 4 a 5 c

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✗

3 Study the following figure, then choose the correct word:

(a) decreases - slower

(b) increases - faster

4 A Transparent B Opaque

Model Exam 4

1 Choose the correct answer:

1 b 2 d 3 c 4 d 5 c

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗

3 Speed of the yellow car
= distance ÷ time = 10 ÷ 5 = 2 m/sec

Speed of the green car = distance ÷ time
= 20 ÷ 5 = 4 m/sec.

The green car is faster.

4 Figure (2)

Model Exam 5

1 Choose the correct answer:

1 b 2 c 3 a 4 c 5 b

2 Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✗

3 Speed = distance ÷ time

= 1200 ÷ 20 = 60 m/sec

4 Classify the following words in the table:

Digestive System	Nervous System	Respiratory System
- Tongue - Anus - Liver - Stomach - Small Intestine	- Brain - Spinal cord - Nerves	- Lungs - Nose - Alveoli

Model Exam 6

1 Choose the correct answer:

1 b 2 c 3 a 4 b 5 b

2 The red car faster because it covers longer distance at the same time.

3 Choose from column (A) what suits it in column (B):

1 b 2 a 3 e 4 d 5 c

4 What is the types of adaptation in the following cases?

1 Behavioral 2 Structural

3 Structural 4 Behavioral

Model Exam 7

1 Choose the correct answer:

1 c 2 a 3 d 4 a 5 b

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗

3 Classify the following according to the sense that the living organism uses to communicate and survive:

Movement	Hearing Sense	Smell Sense	Touch Sense	Taste Sense
Bees	-Dolphins -Bats -Egyptian mongooses	Ants	Snakes	Panther chameleon

4 Speed = distance ÷ time= 200 ÷ 5

= 40 km/hr

Model Exam 8

1 Choose the correct answer:

1 b 2 c 3 d 4 b 5 c

2 Put (✓) or (✗):

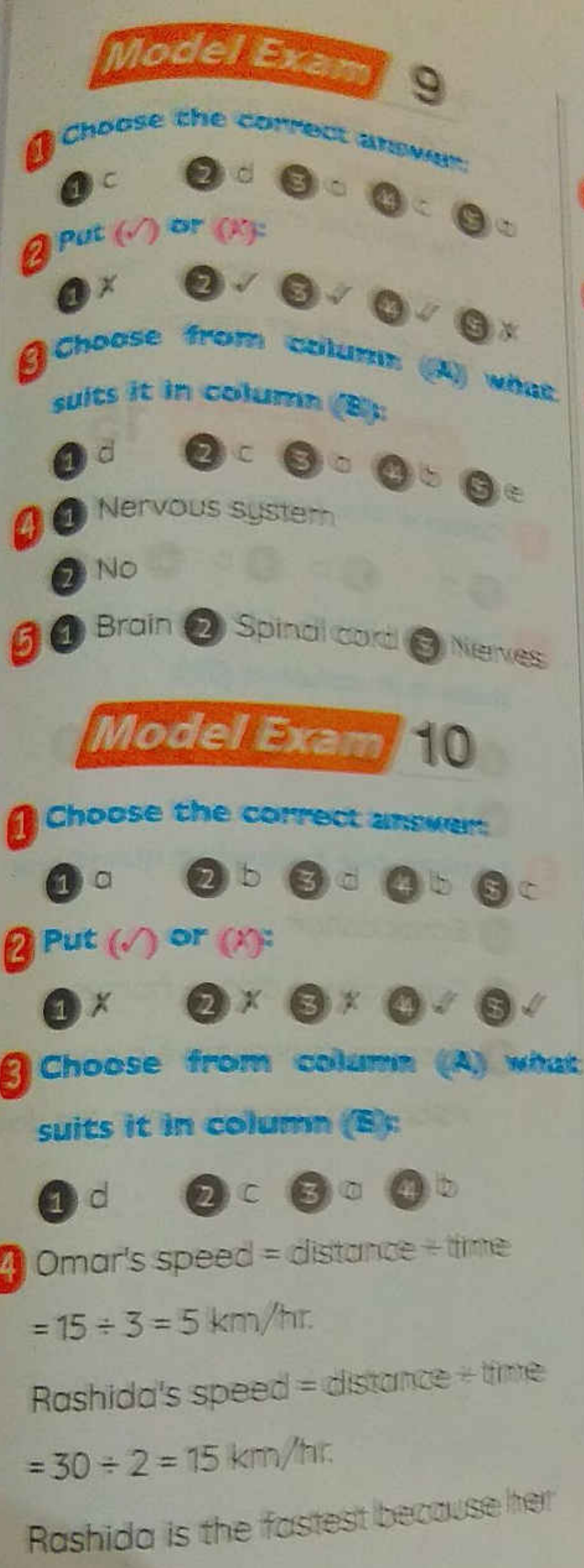
1 ✗ 2 ✓ 3 ✓ 4 ✗ 5 ✗

3 Classify the following words in the table:

Shiny Surfaces	Rough Surfaces	Transparent Surfaces
Mirror Metal	Wood	Glass Plastic

4 Choose from column (A) what suits it in both columns (B) & (C):

1 b-c 2 c-a 3 a-b



Model Exam 9

1 Choose the correct answer:

1 c　2 d　3 a　4 c　5 b

2 Put (✓) or (✗):

1 ✗　2 ✓　3 ✓　4 ✓　5 ✗

3 Choose from column (A) what suits it in column (B):

1 d　2 c　3 a　4 b　5 e

4 1 Nervous system

2 No

5 1 Brain 2 Spinal cord 3 Nerves

Model Exam 10

1 Choose the correct answer:

1 a　2 b　3 d　4 b　5 c

2 Put (✓) or (✗):

1 ✗　2 ✗　3 ✗　4 ✓　5 ✓

3 Choose from column (A) what suits it in column (B):

1 d　2 c　3 a　4 b

4 Omar's speed = distance ÷ time

$= 15 \div 3 = 5$ km/hr.

Rashida's speed = distance ÷ time

$= 30 \div 2 = 15$ km/hr.

Rashida is the fastest because her speed is greater.

Model Exam 11

1 Choose the correct answer:

1 c　2 c　3 a　4 b　5 c

2 Put (✓) or (✗):

1 ✗　2 ✗　3 ✓　4 ✗　5 ✗

3 Complete using the following words:

1 Fennec foxes　2 Bats

3 Owls　4 Bull sharks

4 Arrange the following steps:

- Light falls on objects.
- Light reflects on the eyes.
- Eye pupils allow the light to enter the eyes.
- Sensory receptors at the back of the eyes send signals to brain.
- Brain translates these signals.

Model Exam 12

1 Choose the correct answer:

1 d　2 b　3 b　4 c　5 a

2 Put (✓) or (✗):

1 ✗　2 ✗　3 ✗　4 ✓　5 ✓

3 Choose from column (A) what suits it in column (B):

1 d　2 c　3 a　4 b

4 (a) B　(b) A - C

Model Exam 13

1 Choose the correct answer:

1 d 2 b 3 a 4 a 5 c

2 Choose from column (A) what suits it in column (B):

1 d 2 b 3 a 4 e 5 c

3 Speed = distance ÷ time

= 100 ÷ 2 = 50 m/sec.

4 - Light falls on the apple.

- Light reflects from the apple to the eye.
- Light enters the eye through the pupils.
- The sensory receptors of the eyes send signals to the brain to translate them.
- The brain translates and processes this information.

Model Exam 14

1 Choose the correct answer:

1 a 2 b 3 b 4 d 5 c

2 Choose from column (A) what suits it in column (B):

1 b 2 a 3 c 4 e 5 d

3 Arrange the following steps:

- The ball is raised up so it stores potential energy.
- The ball moves toward the other balls.
- When the ball hits the first ball.
- Kinetic energy transfers to all the other balls.
- The last ball moves.
- Some kinetic energy changes to sound and heat energies.

Model Exam 15

1 Choose the correct answer:

1 d 2 b 3 b 4 c 5 d

2 Choose from column (A) what suits it in column (B):

1 e 2 d 3 f 4 c 5 a 6 b

3 Answer the following questions:

1 Echolocation

2 Cats - deer - dogs - horses

3 Because snakes have a poor night vision and cannot see in the dark.



2023

Final Revision

يصرف مجانا مع الكتا



PRIMARY
FIRST TERM

Contents

1 Stories

1. Adaptation
2. Journey to the Desert
3. Adventure in the Ocean
4. Journey to the Forest
5. Digestive System
6. Nocturnal Animals
7. Pollution
8. Push and Pull

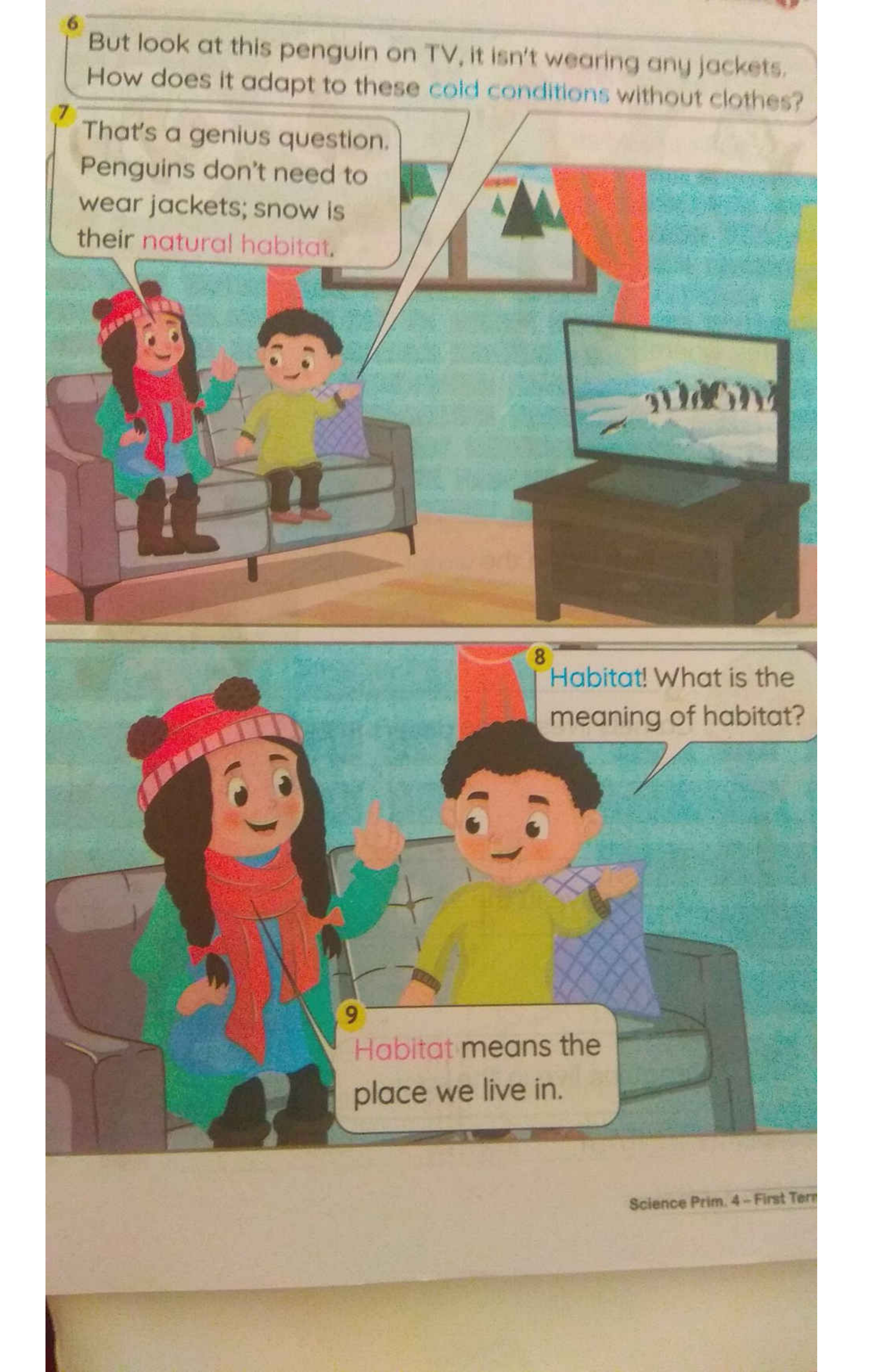
1 Adaptation

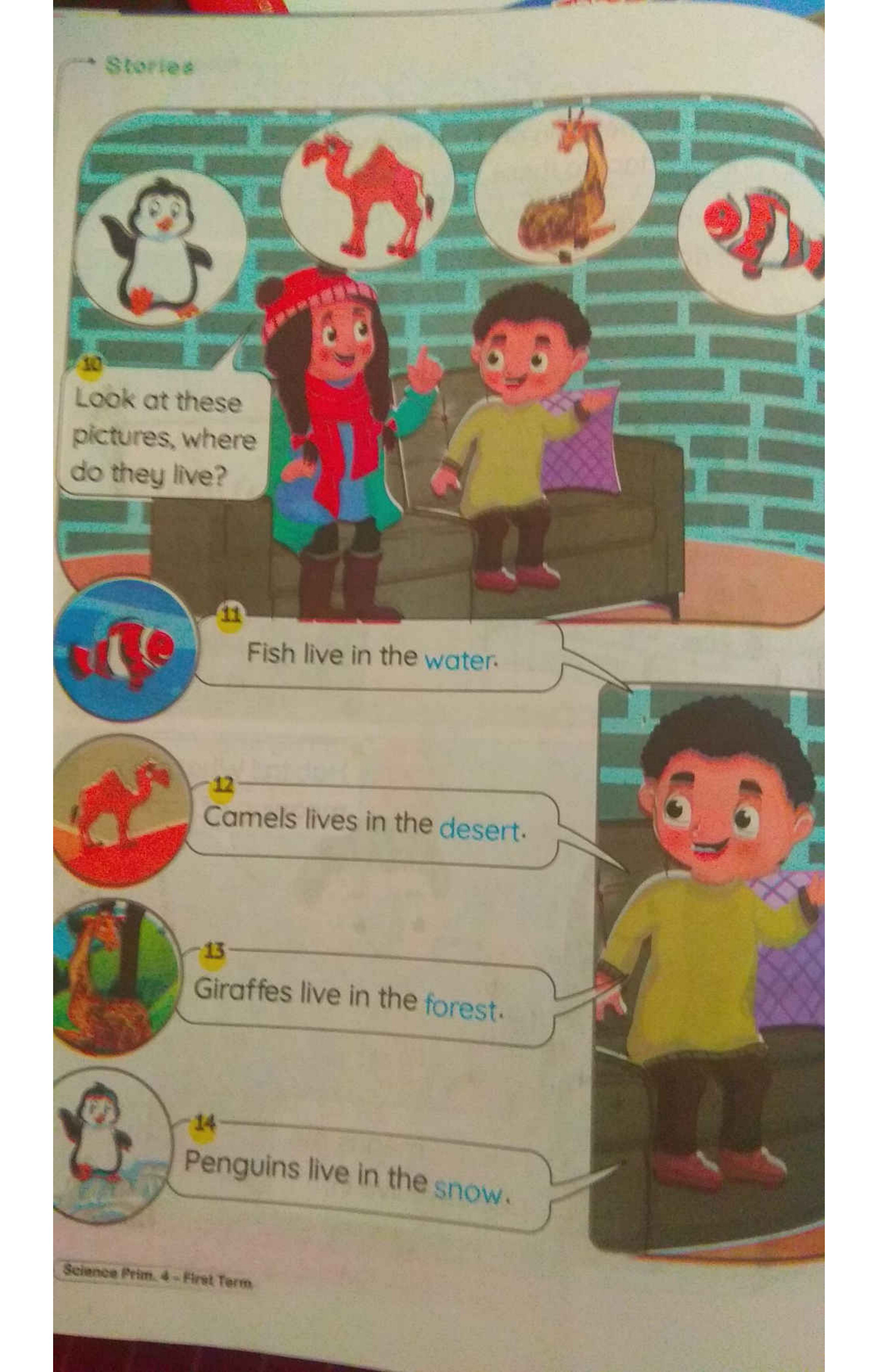


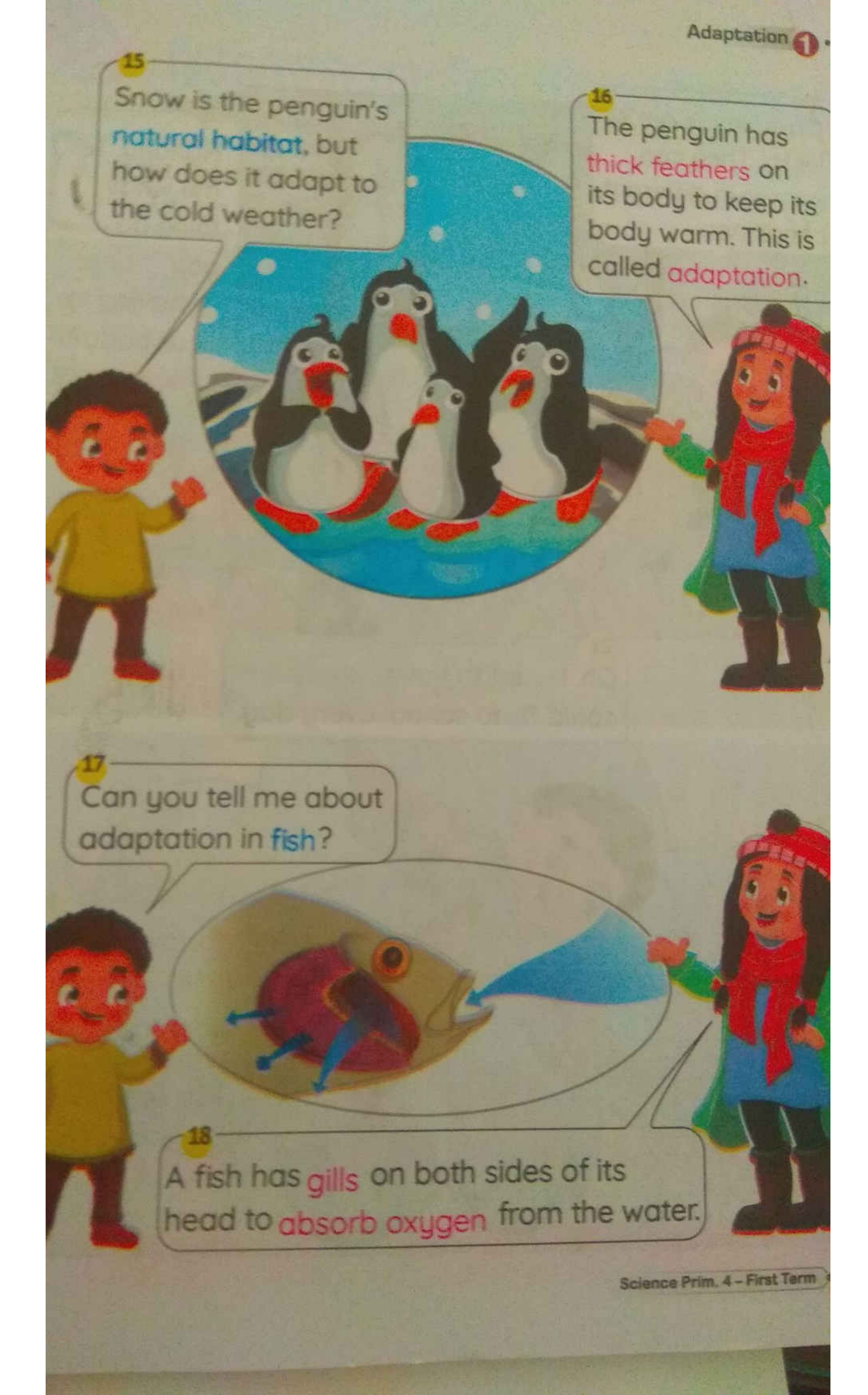
3 Adapt! What is the meaning of adapt?

4 Adapt means we can change ourselves for new conditions.

5 It is very cold outside, so we need to adjust ourselves by wearing jackets.


6
But look at this penguin on TV, it isn't wearing any jackets.
How does it adapt to these cold conditions without clothes?
7
That's a genius question.
Penguins don't need to
wear jackets; snow is
their natural habitat.
8
Habitat! What is the
meaning of habitat?
9
Habitat means the
place we live in.


Stories
10
Look at these pictures, where do they live?
11
Fish live in the water.
12
Camels lives in the desert.
13
Giraffes live in the forest.
14
Penguins live in the snow.
Science Prim. 4 - First Term


15
Snow is the penguin's natural habitat, but how does it adapt to the cold weather?
16
The penguin has thick feathers on its body to keep its body warm. This is called adaptation.
17
Can you tell me about adaptation in fish?
18
A fish has gills on both sides of its head to absorb oxygen from the water.


19
Oh, animals are so lucky. They can survive in different conditions.
20
Hahaha. Tell me what thing do you dream of having in your body?
21
Oh, I want to have wings so I could fly to school every day.

2 Journey to the Deser

At night, Adam dreamed that he was on a trip in the desert with his sister Sara and the school scouting team.





2 I dreamed that we were on a desert trip.
was amazing. How can we go there?

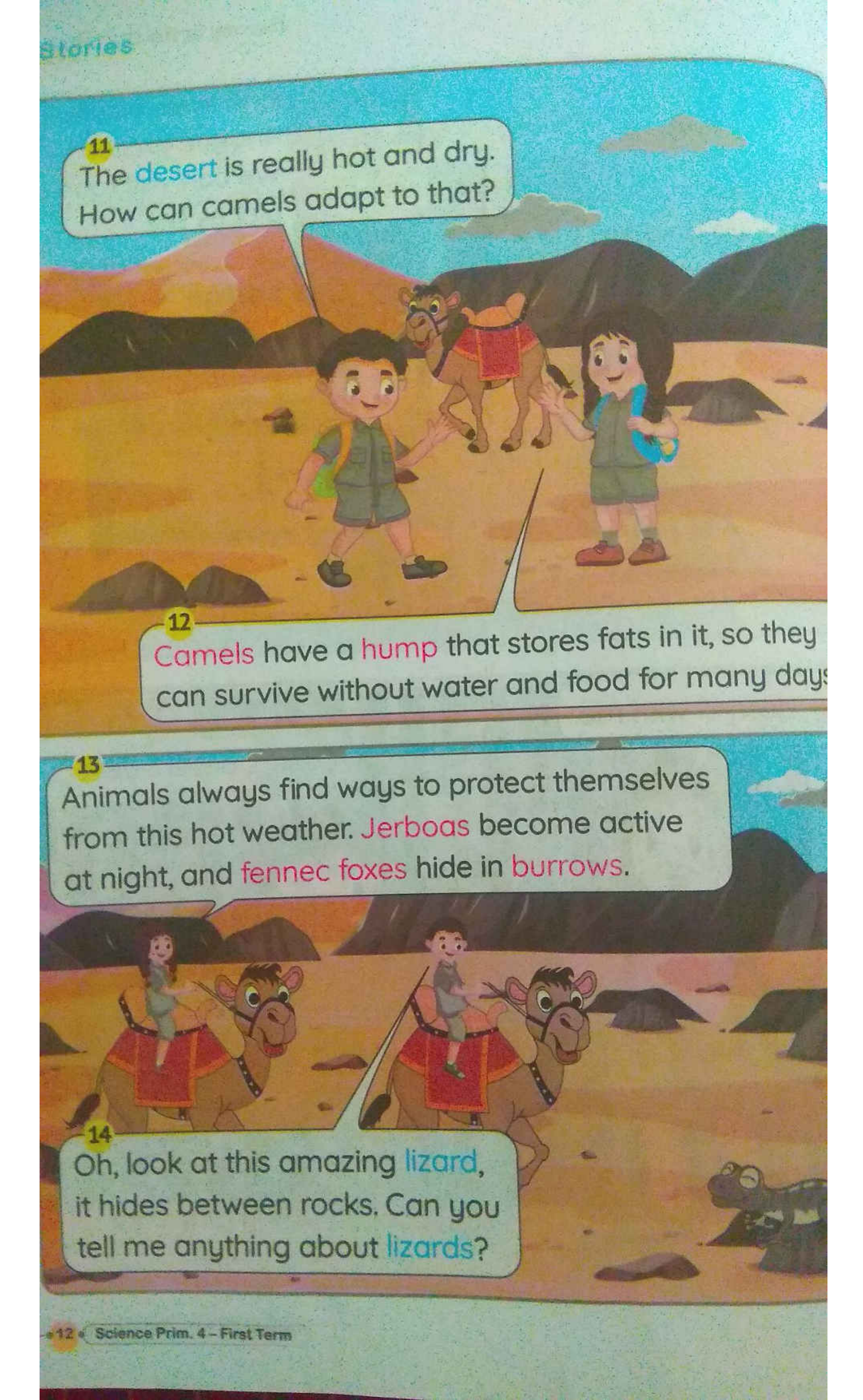
3 I can make you go anywhere,
but can you keep a secret?

4 Of course, yes.

5 I have a magic stick in my
closet that can do anything.

I am very excited. Can we
go to the desert now?

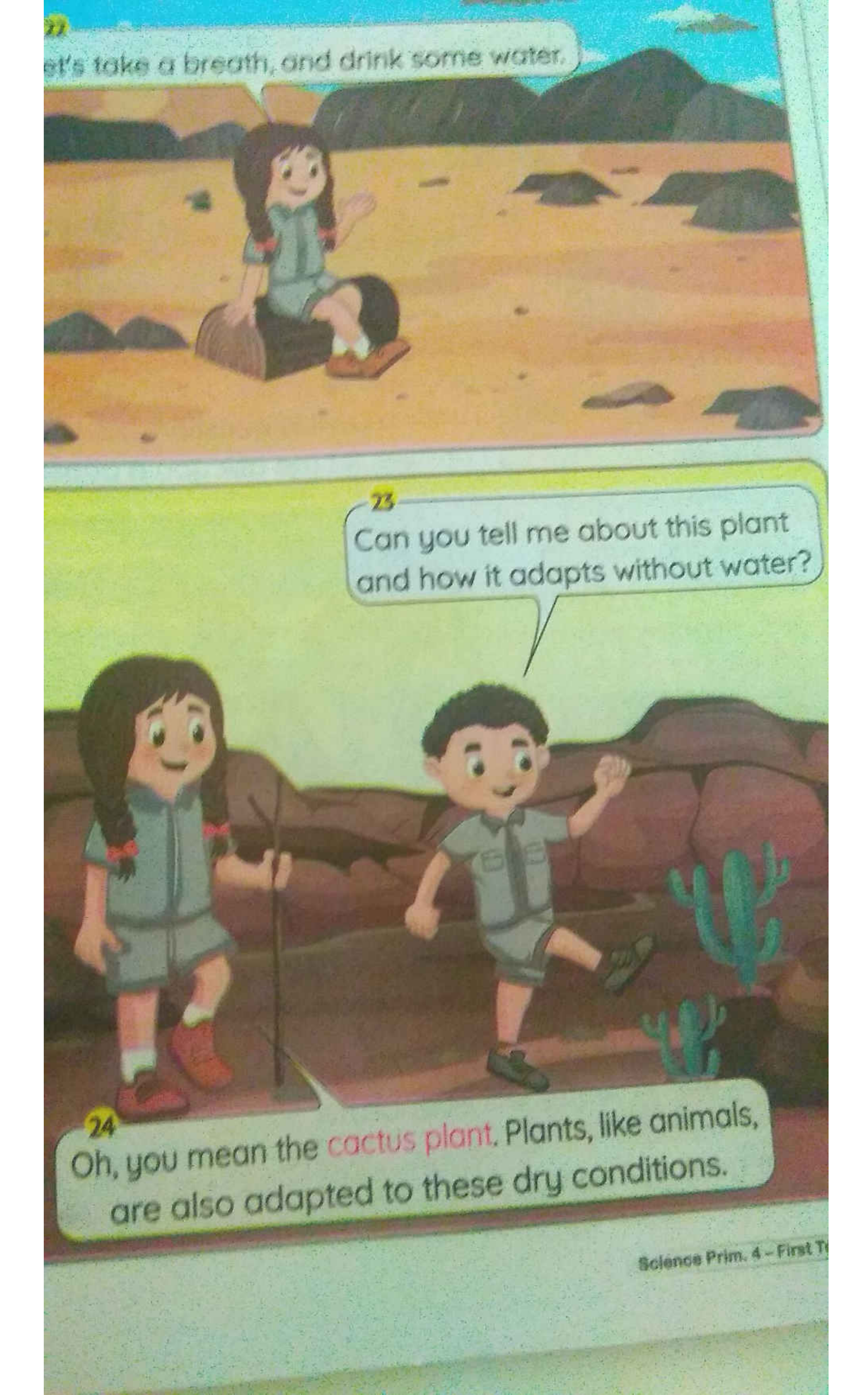

7
Are you excited? We can visit many places like deserts or forests. We can also go diving underwater.
8
Oh, it will be a lot of fun. Lets go!
9
Say "desert" with me.
10
Desert, desert, desert.

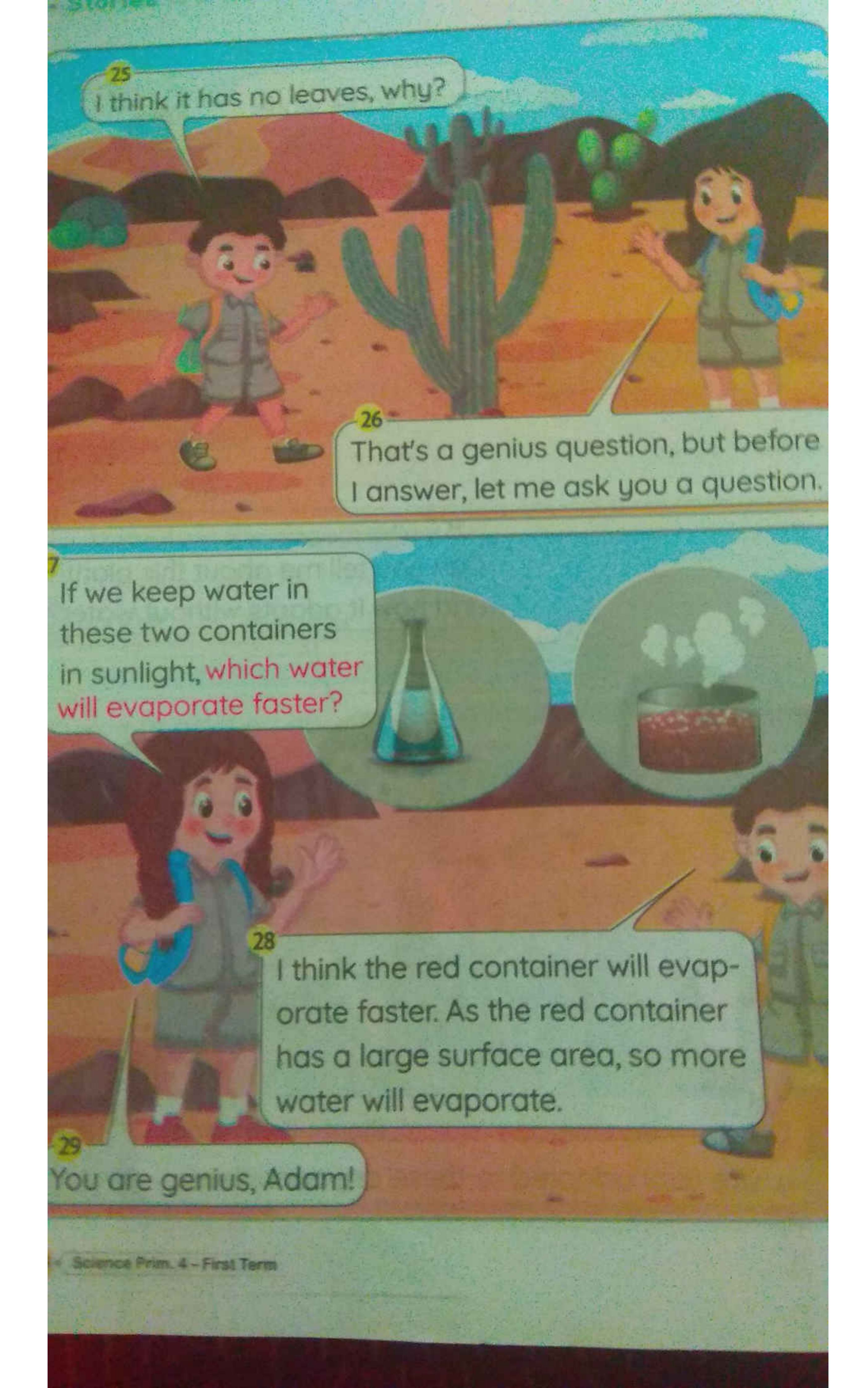

11
The desert is really hot and dry. How can camels adapt to that?
12
Camels have a hump that stores fats in it, so they can survive without water and food for many days
13
Animals always find ways to protect themselves from this hot weather. Jerboas become active at night, and fennec foxes hide in burrows.
14
Oh, look at this amazing lizard, it hides between rocks. Can you tell me anything about lizards?

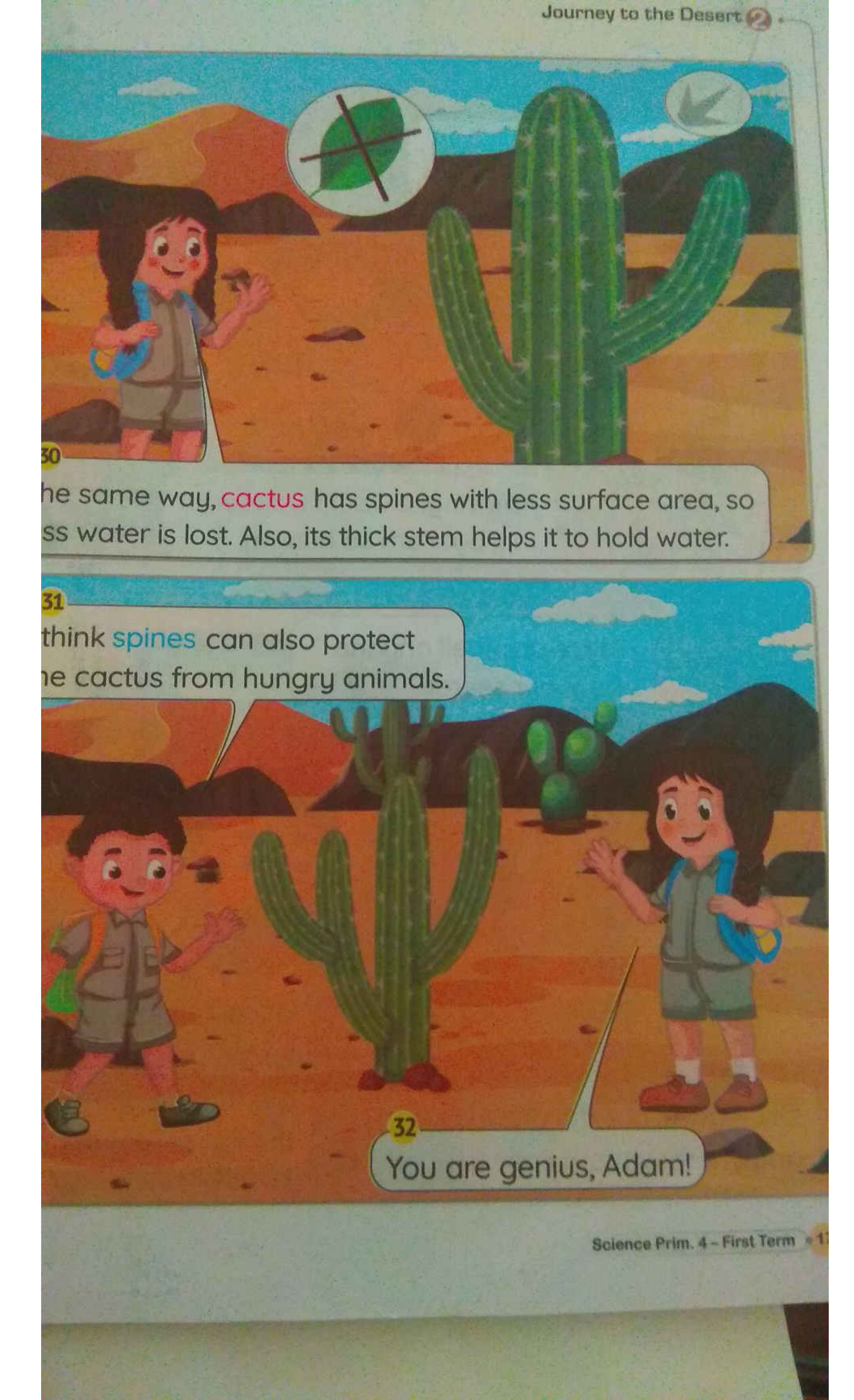

15
Lizards save their energy by finding shaded areas.
When prey comes close, they attack them.
16
Amazing lizard!
What about the fennec fox?
How can we find it?
17
It is very difficult to find a fennec fox here, because it lives in burrows to stay cool on sunny days.

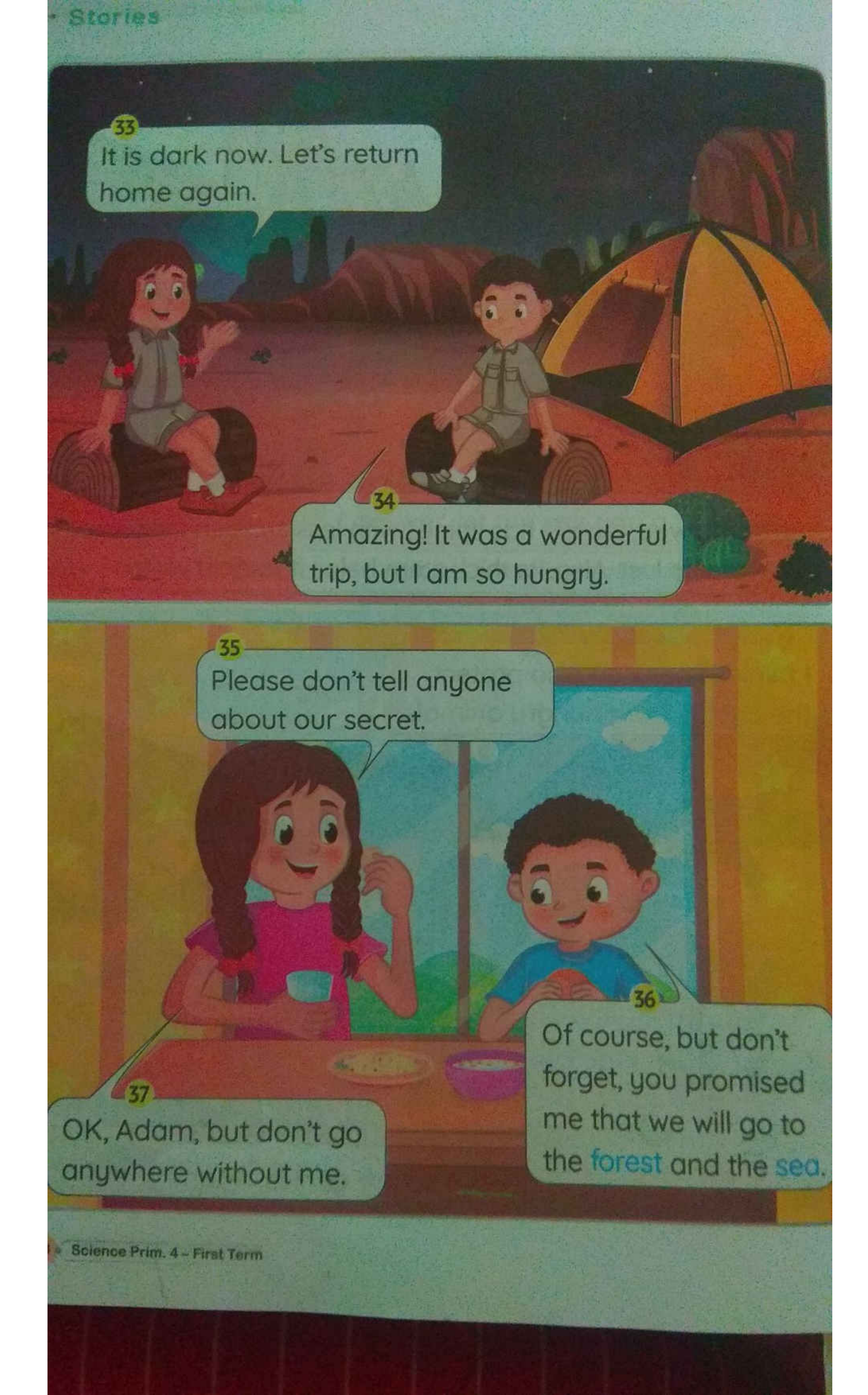

19
The fennec fox adapted to eat different kinds of food, such as insects, fruits, plant roots and remnants of prey. As it is hard to find any food in the desert.
18
Animals in the desert are unlucky. I wonder how the fennec fox finds any food.


0
vant to ask you about its extra-large ears?
21
They helps it to lose heat and cool its body.

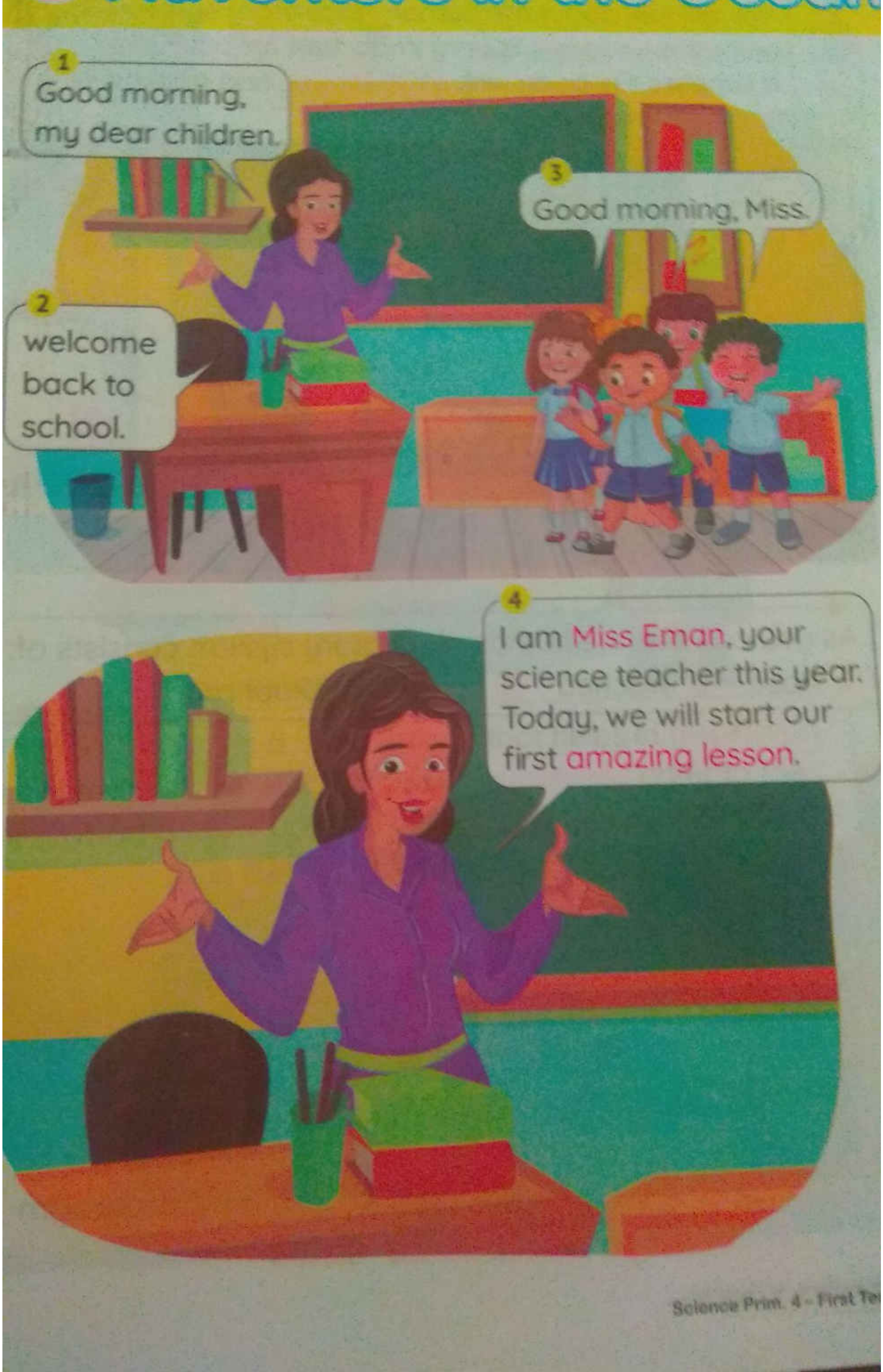

et's take a breath, and drink some water.
23
Can you tell me about this plant and how it adapts without water?
24
Oh, you mean the cactus plant. Plants, like animals, are also adapted to these dry conditions.

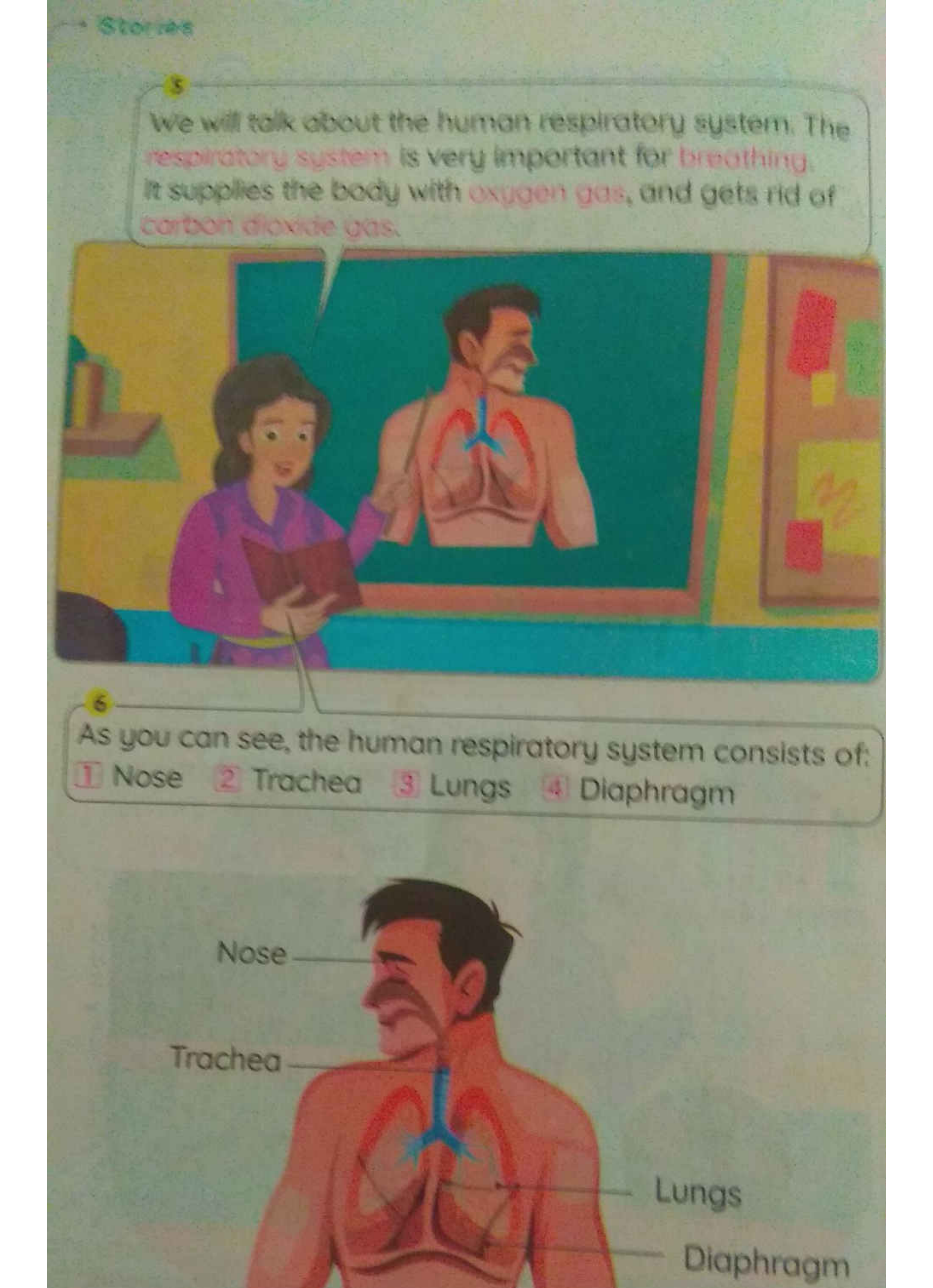

25
I think it has no leaves, why?
26
That's a genius question, but before I answer, let me ask you a question.
If we keep water in these two containers in sunlight, which water will evaporate faster?
28
I think the red container will evaporate faster. As the red container has a large surface area, so more water will evaporate.
29
You are genius, Adam!

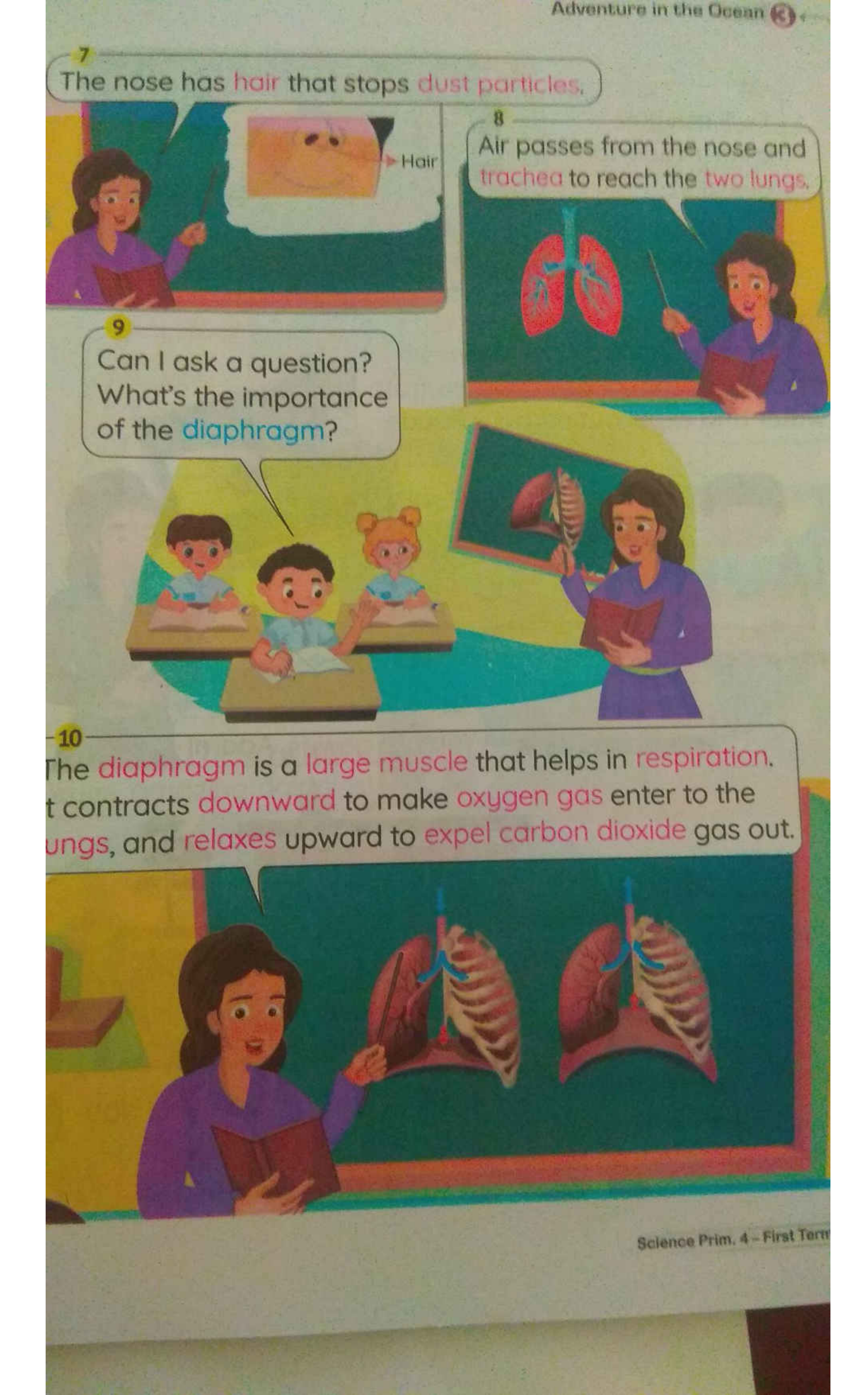

30
he same way, cactus has spines with less surface area, so
ss water is lost. Also, its thick stem helps it to hold water.
31
think spines can also protect
he cactus from hungry animals.
32
You are genius, Adam!


33
It is dark now. Let's return home again.
34
Amazing! It was a wonderful trip, but I am so hungry.
35
Please don't tell anyone about our secret.
36
Of course, but don't forget, you promised me that we will go to the forest and the sea.
37
OK, Adam, but don't go anywhere without me.

3 Adventure in the Ocean



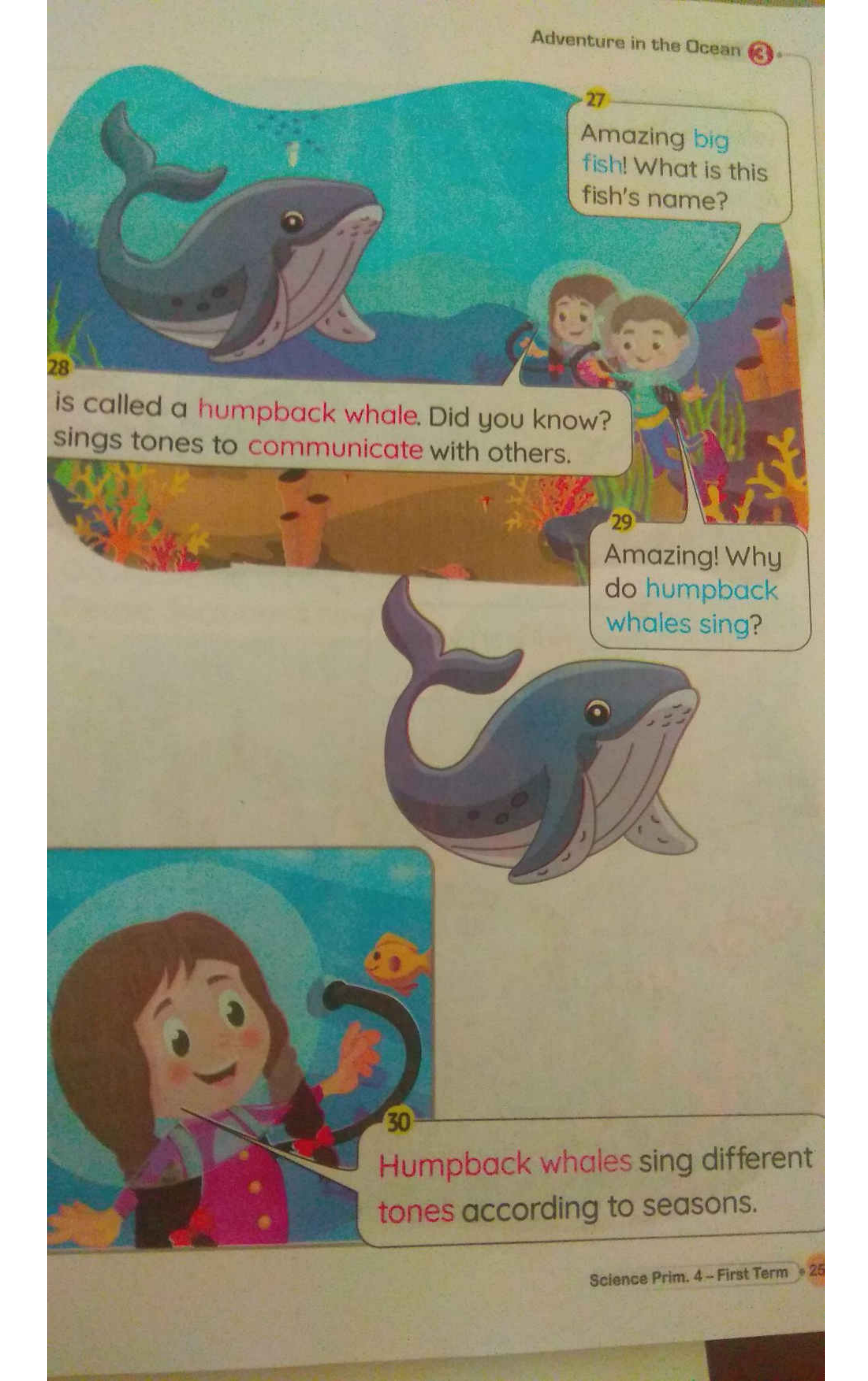

5
We will talk about the human respiratory system. The respiratory system is very important for breathing. It supplies the body with oxygen gas, and gets rid of carbon dioxide gas.
6
As you can see, the human respiratory system consists of:
1 Nose 2 Trachea 3 Lungs 4 Diaphragm
Nose
Trachea
Lungs
Diaphragm

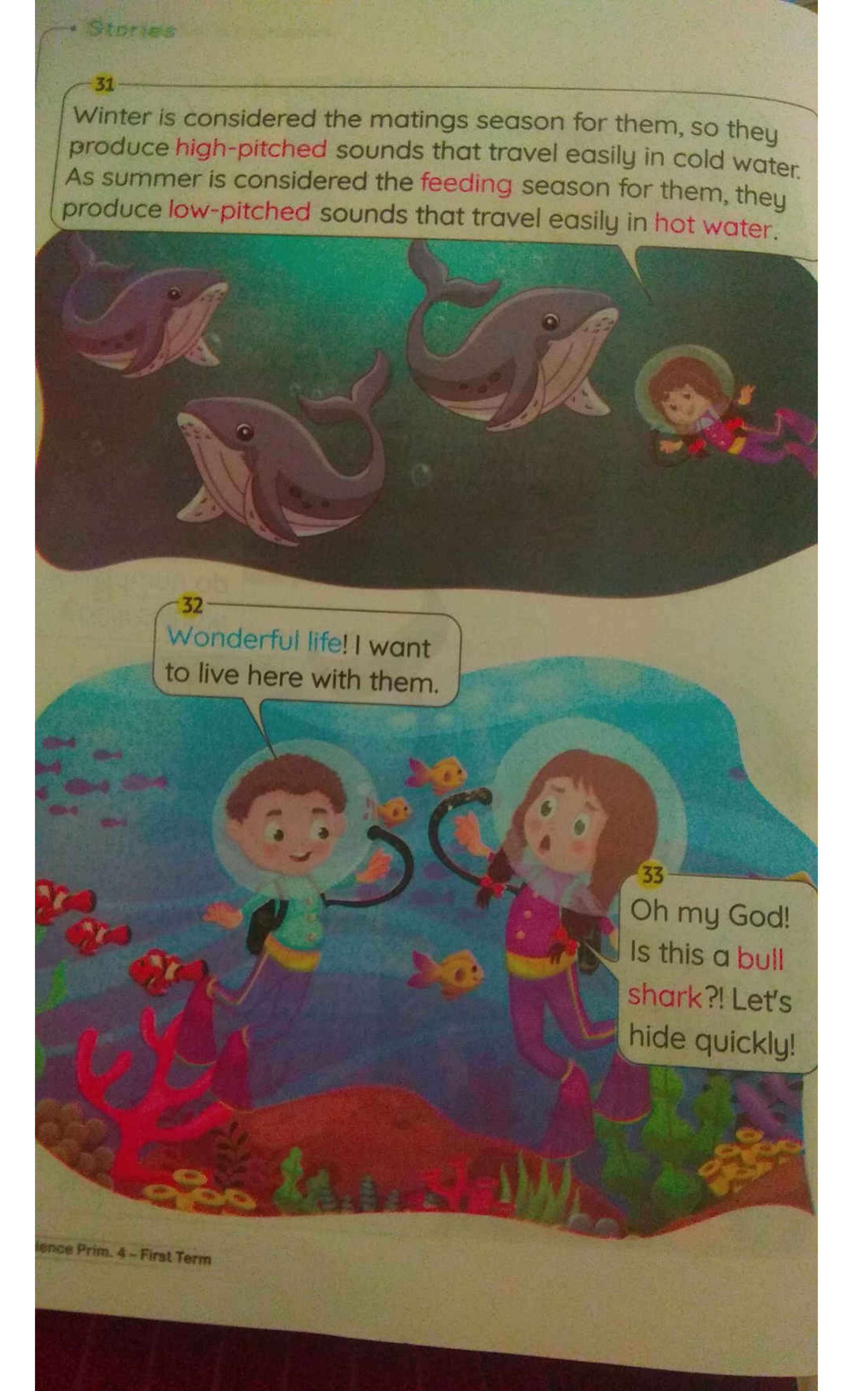

7
The nose has hair that stops dust particles.
Hair
8
Air passes from the nose and trachea to reach the two lungs.
9
Can I ask a question? What's the importance of the diaphragm?
10
The diaphragm is a large muscle that helps in respiration.
t contracts downward to make oxygen gas enter to the
ungs, and relaxes upward to expel carbon dioxide gas out.


11
I will ask you a very important question. Do fish breathe like humans?
12
No, fish have gills on both sides of their heads that absorb oxygen from water and expel out carbon dioxide.
13
You are genius, Adam!
SCHOOL
14
How was your first day at school?
15
It was a wonderful day. My teacher asked me and I answered her.


16
I think we can go diving today, you promised me.
17
OK Adam, eat all your food and I will bring my magic stick.
18
Yes, let's have a lot of fun!
19
Say "ocean" with me.
20
Ocean.
21
Yes! I can't believe my eyes, amazing dolphins!
22
You are right, dolphins are so friendly.


23
Can you tell me about dolphins?
How do they eat and hunt?
24
Dolphins use echo to locate their prey in dark water.
25
Echo! What does that word mean?
26
Dolphins produce sound waves through water, and when these waves hit any object, they reflect back to the dolphins as echo. This helps dolphins to locate the prey.


27
Amazing big fish! What is this fish's name?
28
is called a humpback whale. Did you know?
sings tones to communicate with others.
29
Amazing! Why do humpback whales sing?
30
Humpback whales sing different tones according to seasons.


31
Winter is considered the matings season for them, so they produce high-pitched sounds that travel easily in cold water.
As summer is considered the feeding season for them, they produce low-pitched sounds that travel easily in hot water.
32
Wonderful life! I want to live here with them.
33
Oh my God! Is this a bull shark?! Let's hide quickly!



34
Oh, let's go back home quickly!
35
Don't be afraid, I will use my magic stick.
36
Oh, it saw me, oh my God! Please, Sara, use it now!


37
Hahahahahaha, it ran away.
I am so strong.
38
Let's go
back hom
Adam, it
is not safe
here.
39
The bull shark ran away from me, I can't believe
it. Can you tell me about the bull shark?



The bull shark is a dangerous predator.
It lives in fresh or salty water.
It can hunt its prey anytime, so its prey can't predict it.
As you can see, it has sharp teeth to tear up its prey.





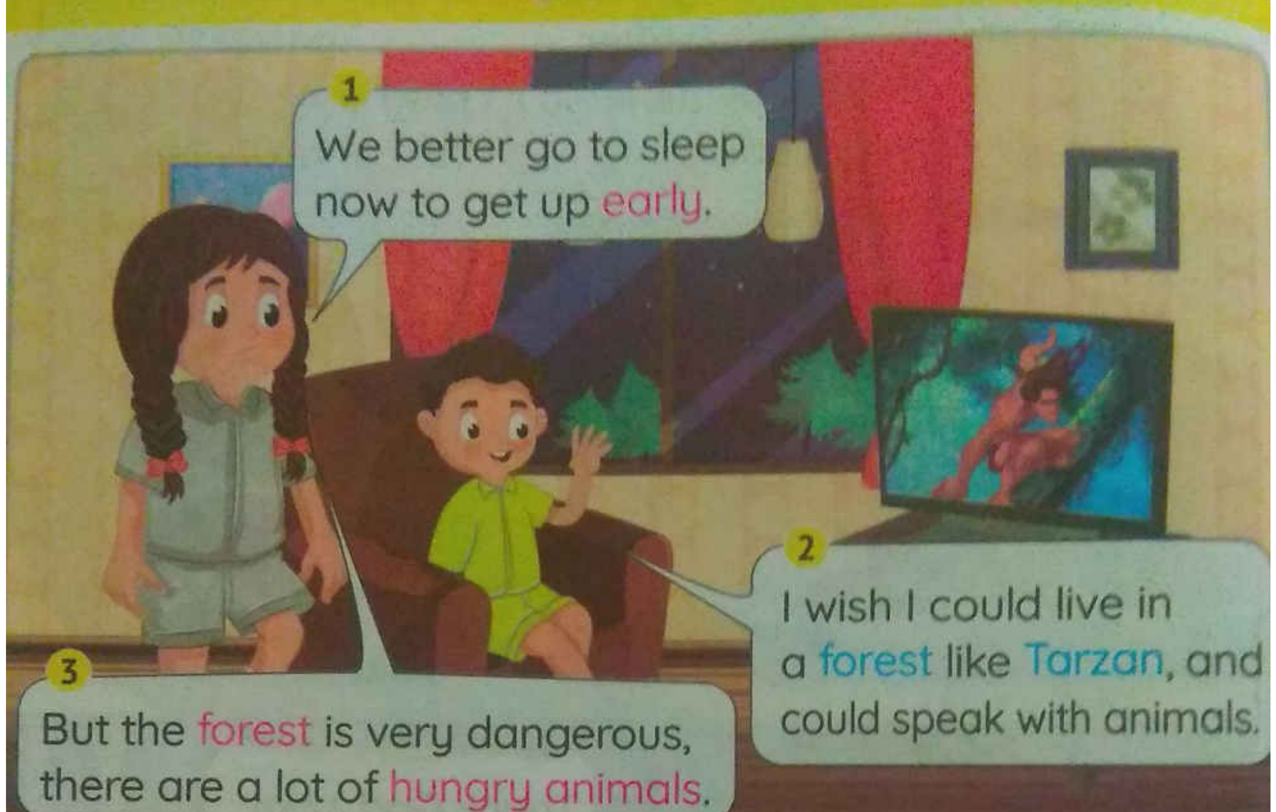
41

Thank God, I am still alive. Without you Sara, I would have been a prey.

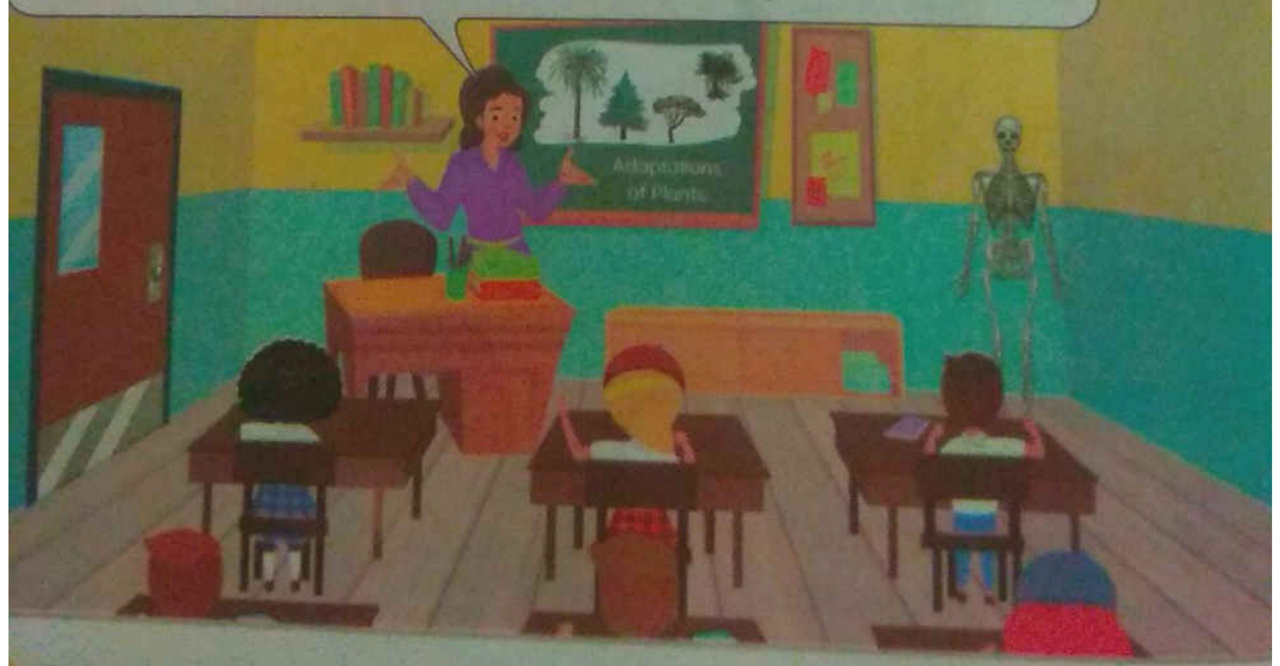
42

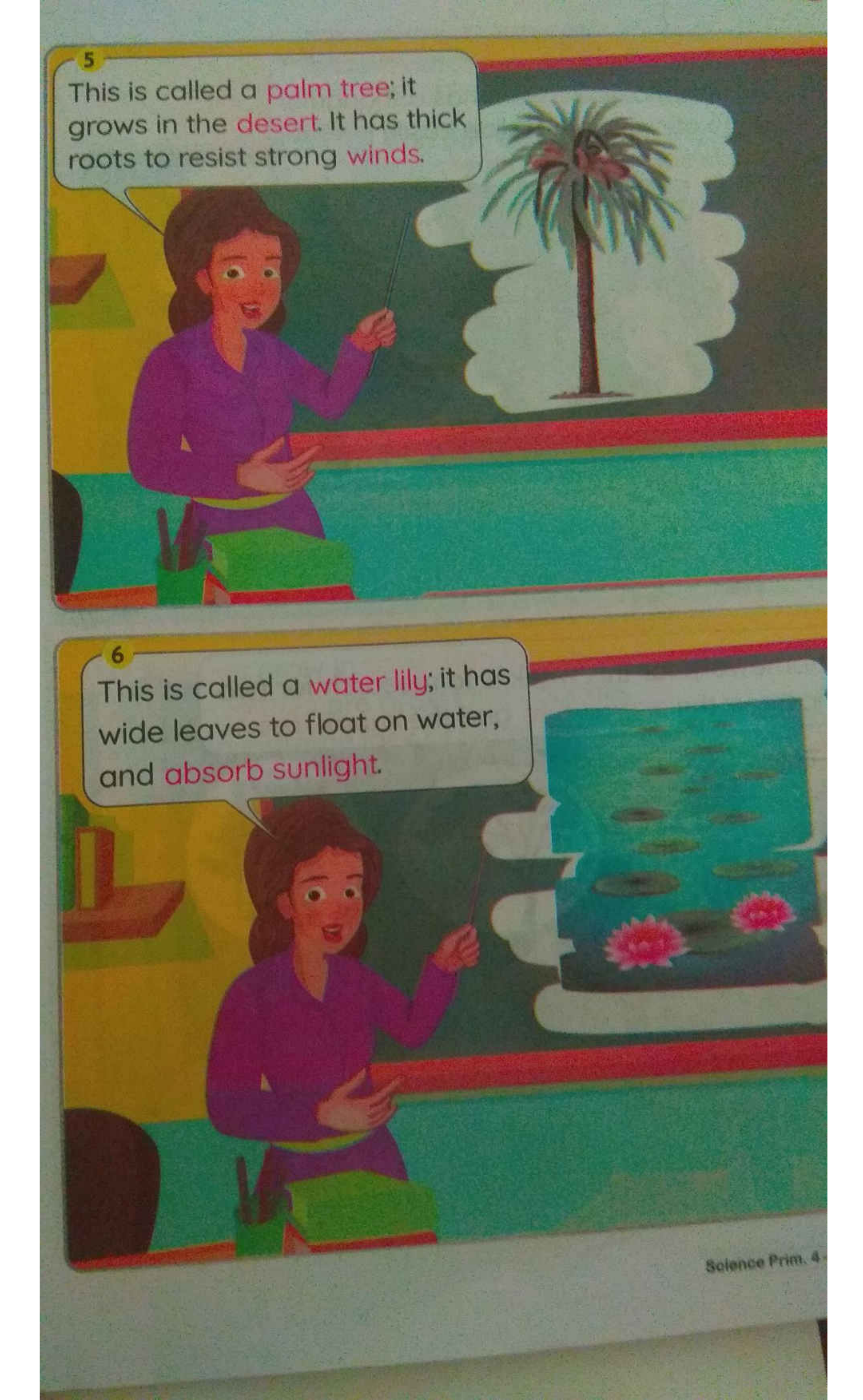
Thank God. Don't be afraid. If you are with me, the magic stick always does its job.

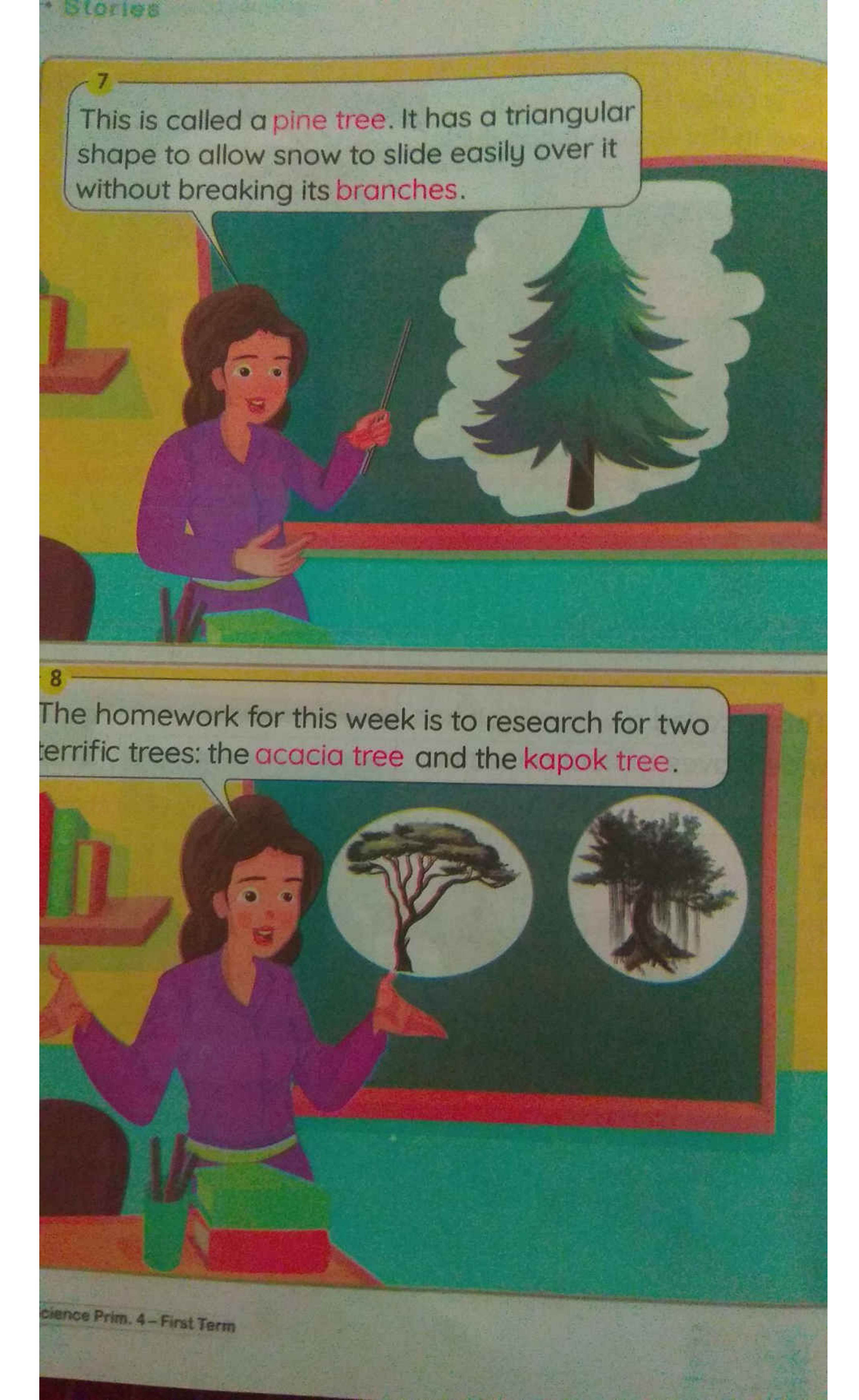
4 Journey to the Forest



Next Day at School



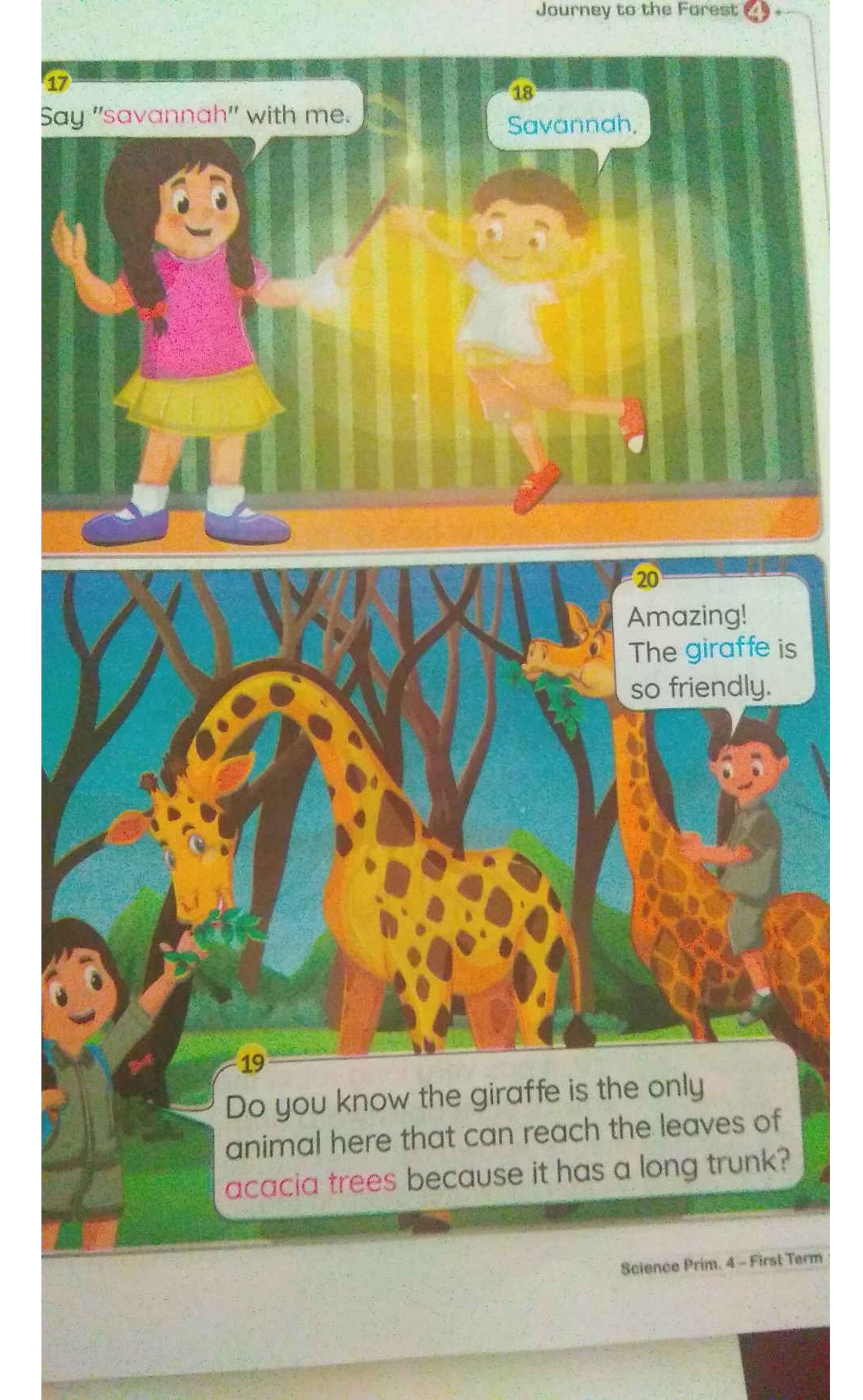

5
This is called a palm tree; it grows in the desert. It has thick roots to resist strong winds.
6
This is called a water lily; it has wide leaves to float on water, and absorb sunlight.
Science Prim. 4


7
This is called a pine tree. It has a triangular shape to allow snow to slide easily over it without breaking its branches.
8
The homework for this week is to research for two terrific trees: the acacia tree and the kapok tree.

In the Afternoon




13
The kapok tree grows in the Amazon rainforest. It is a rainforest, where it is easy to find water.
14
Can we go there, please?
15
But the forest is very dangerous, you must stay close to me.
16
OK, I promise you, I will do everything you want.


17
Say "savannah" with me.
18
Savannah.
19
Do you know the giraffe is the only animal here that can reach the leaves of acacia trees because it has a long trunk?
20
Amazing! The giraffe is so friendly.

21

Sometimes it defends itself by producing a poison when an animal eats its leaves. It also has a sharp spine.

22

Amazing! But the weather here is dry and hot, how does an acacia tree get water to grow like that?

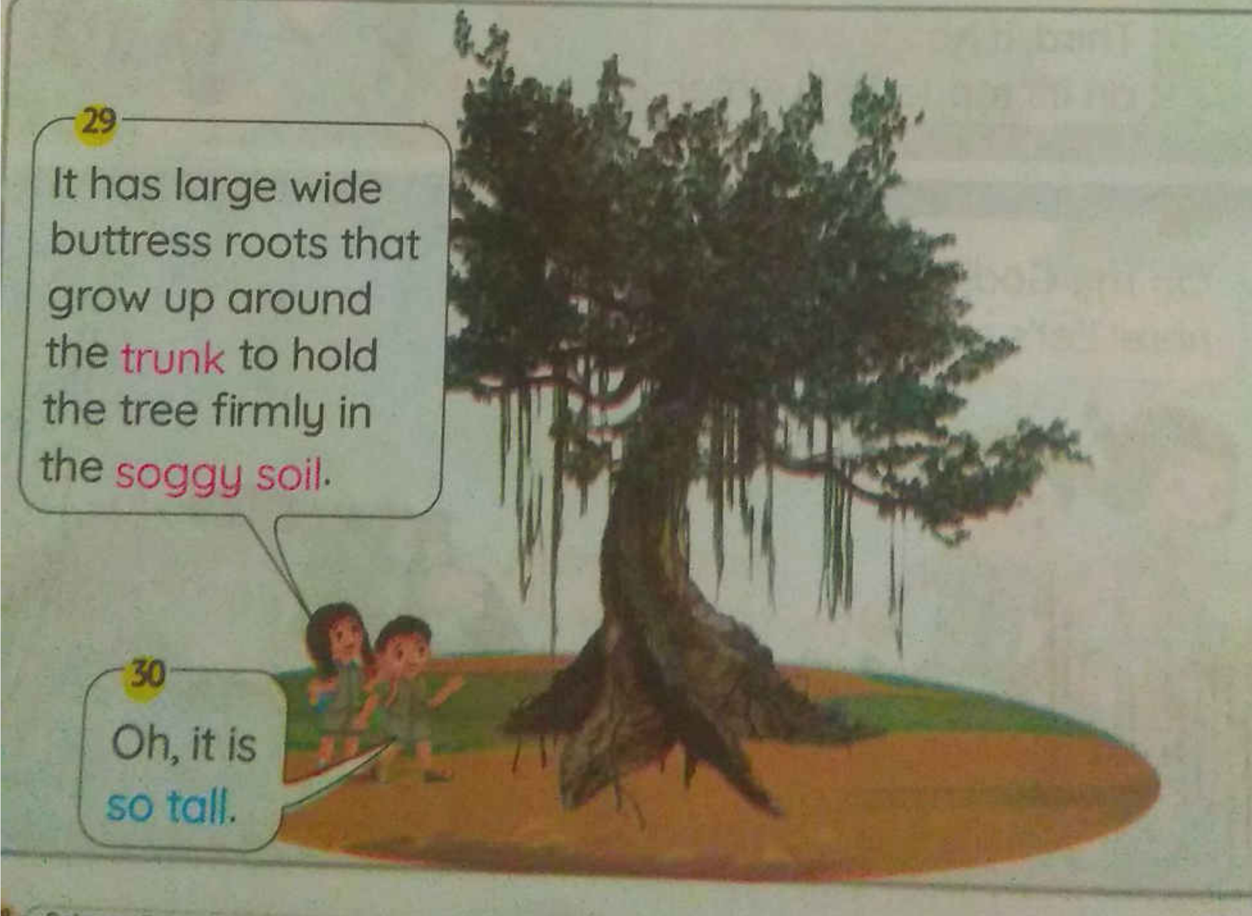
23

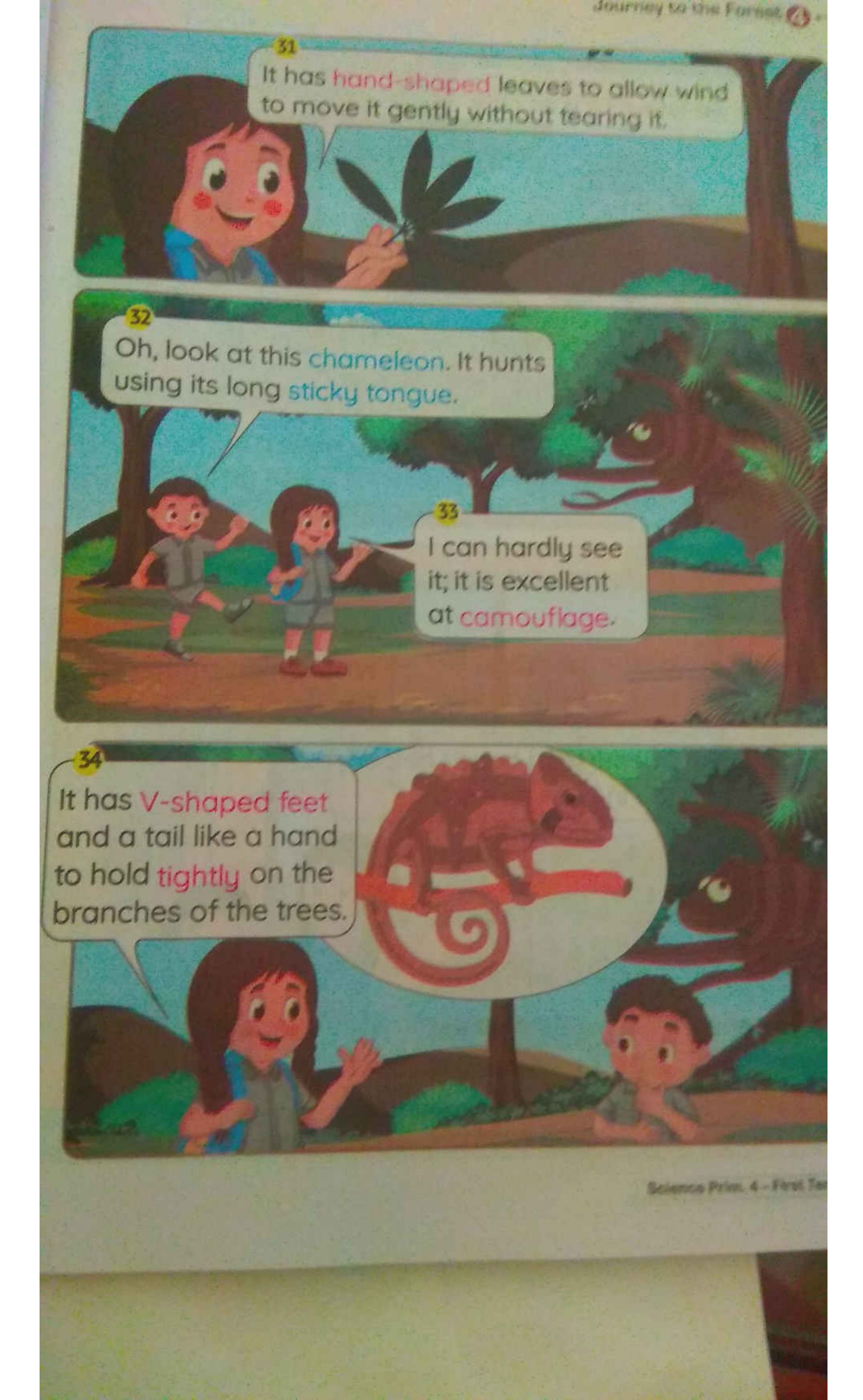
In many ways, Adam.
First, it has very long roots that grow directly downward and they're known as "taproot", to search for water deep in the soil.


24
Second, it stores water in its trunk as a camel stores fats in its hump.
25
Third, it has tiny leaves on its top to hold water.
26
Oh my God! There's a lion here! Let's escape quickly.

27 Oh, thank God. Where are we now?

28 We are in the Amazon forest. It is very dangerous here too, so let's take a look at the kapok tree and go back home quickly.




31
It has hand-shaped leaves to allow wind to move it gently without tearing it.
32
Oh, look at this chameleon. It hunts using its long sticky tongue.
33
I can hardly see it; it is excellent at camouflage.
34
It has V-shaped feet and a tail like a hand to hold tightly on the branches of the trees.

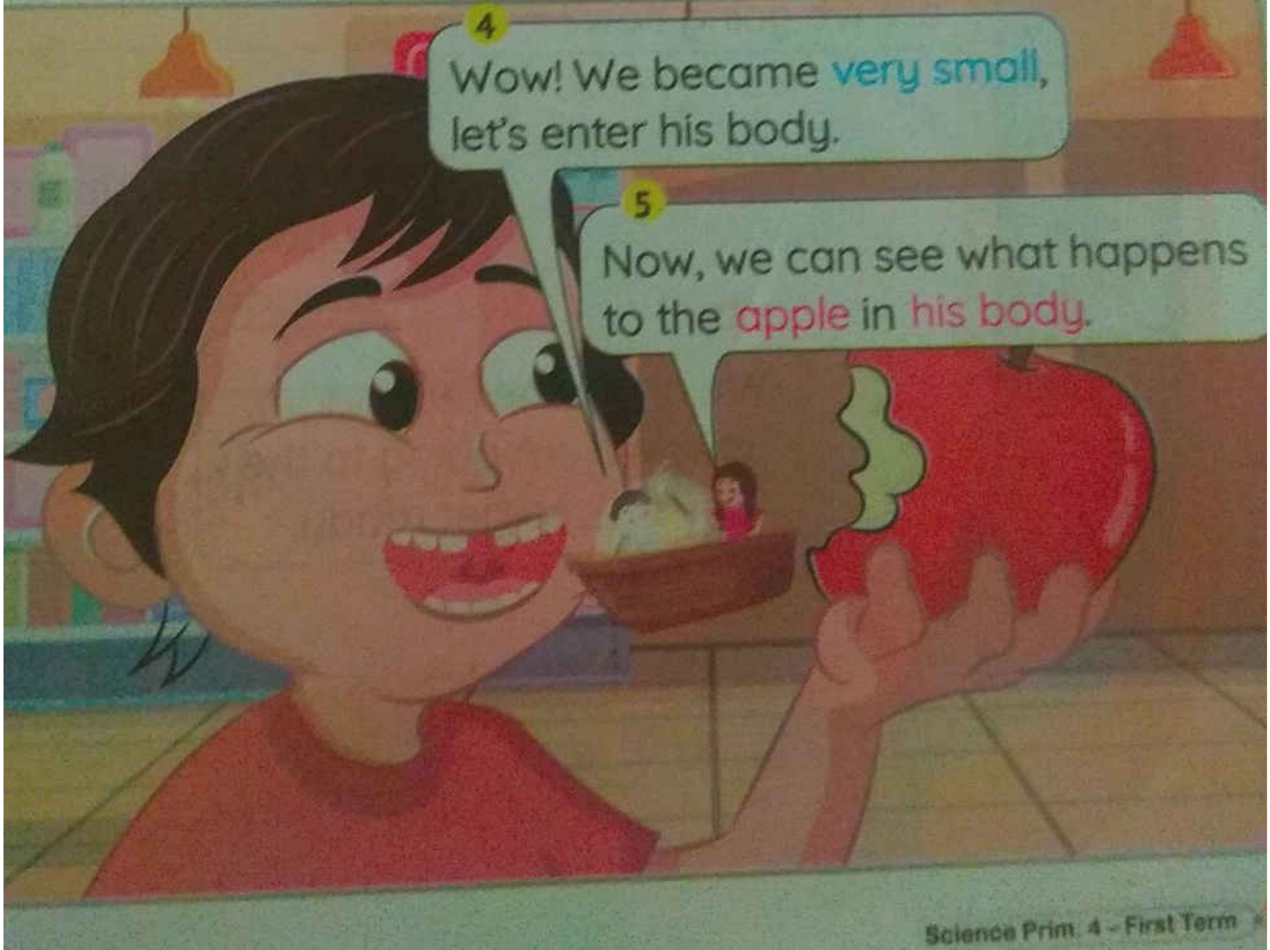

35
Can we take it? It is so cute.
36
It is better to leave it in its natural habitat, let's go back.
37
What an amazing day! Thank you, Sara.
38
Of courses, I hope I helped you in your research.
39
Yes of course, now I can start to do it.

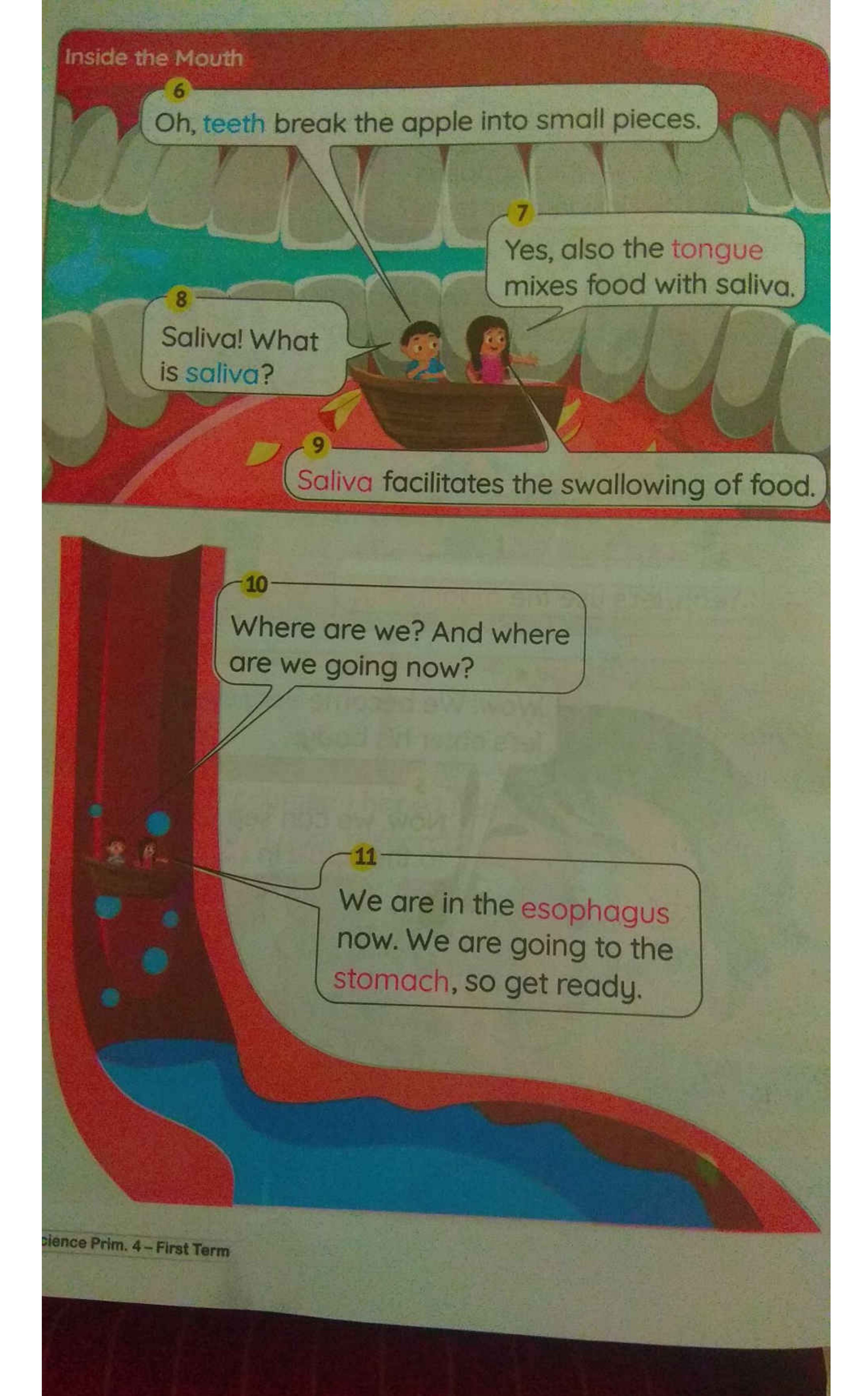
5 Digestive System

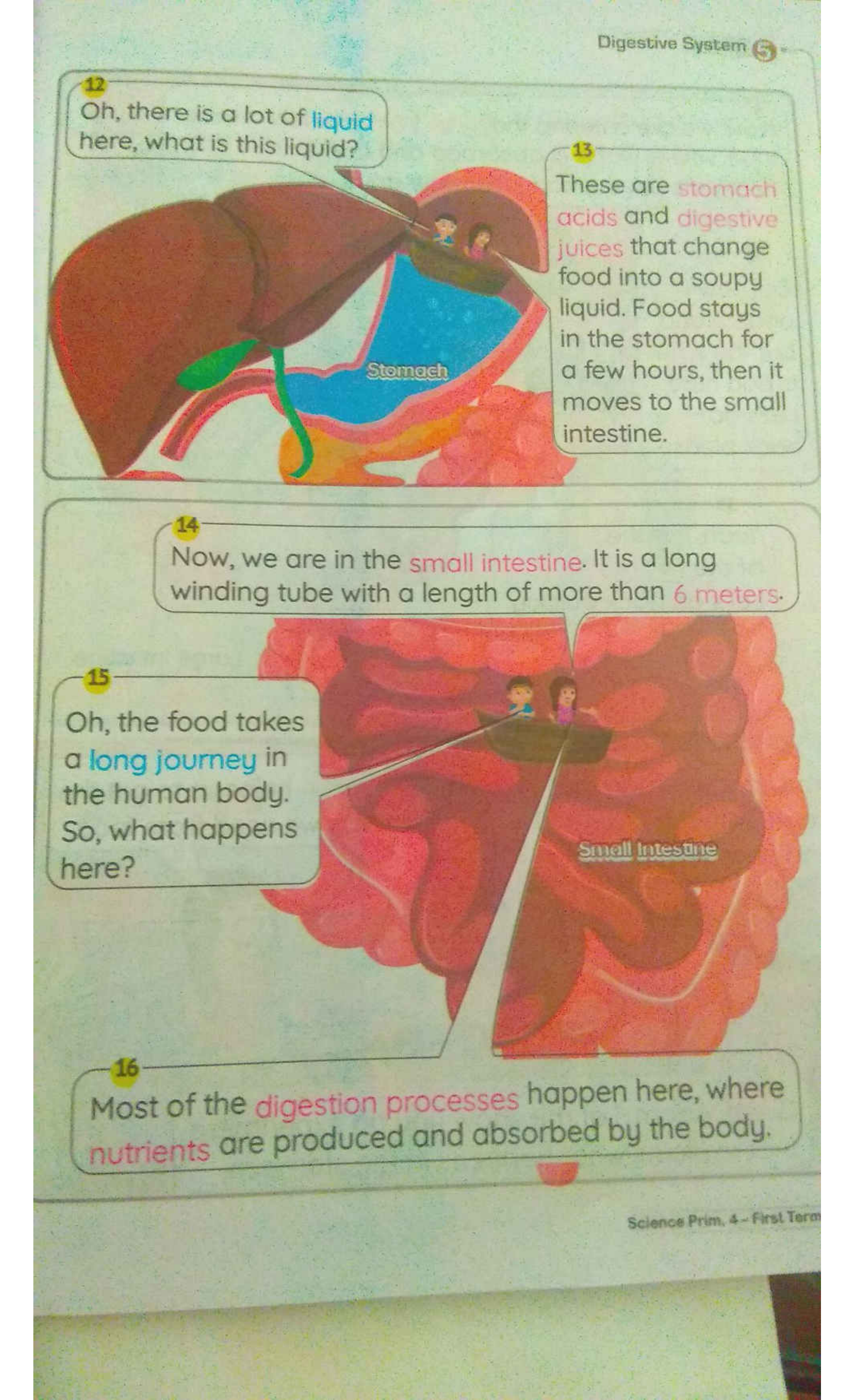
1 Do you know what happens to the food inside your body?

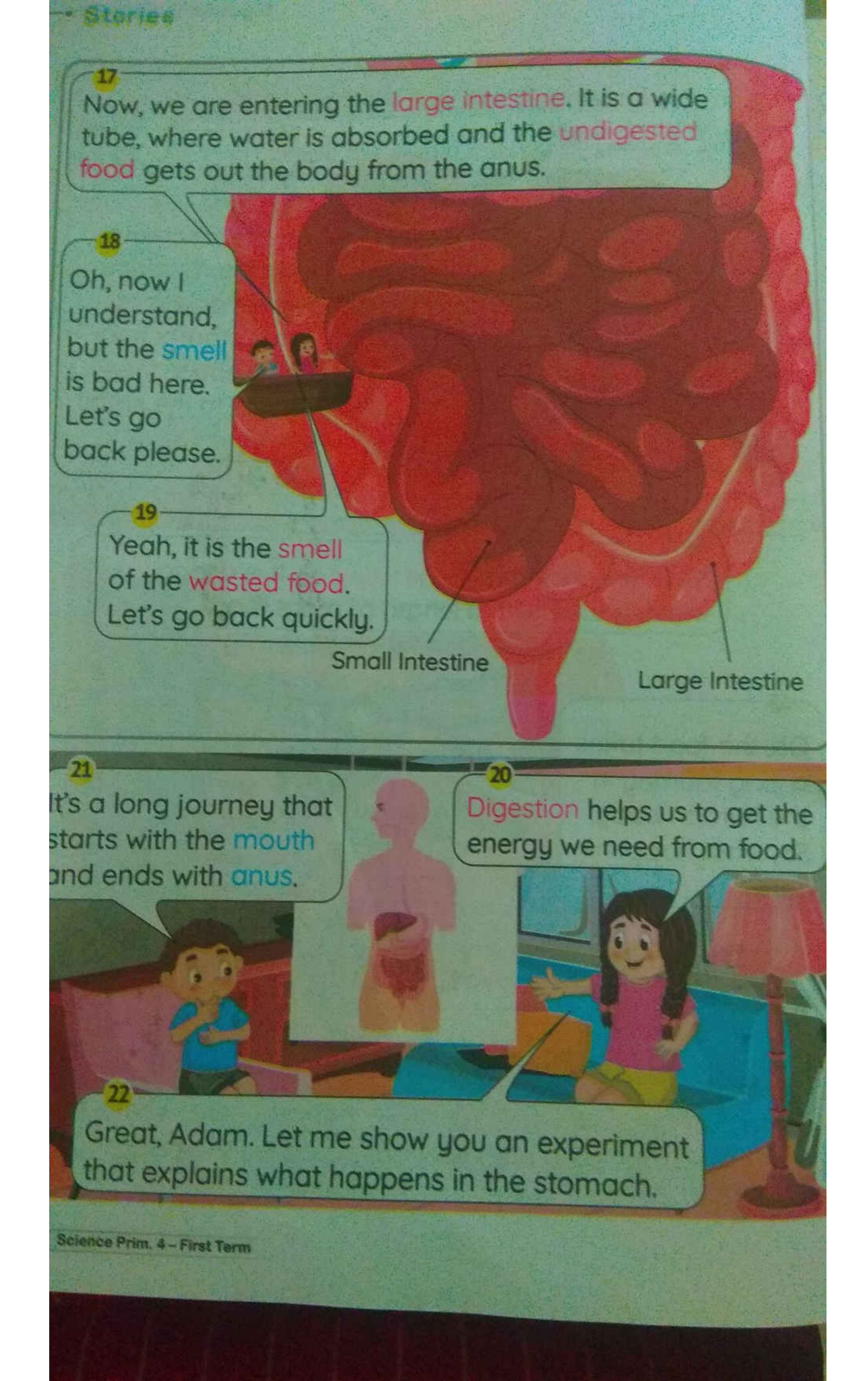
2 I wish I could become as small an apple to know.

3 Yeah, let's use the magic stick.




Inside the Mouth
6
Oh, teeth break the apple into small pieces.
7
Yes, also the tongue mixes food with saliva.
8
Saliva! What is saliva?
9
Saliva facilitates the swallowing of food.
10
Where are we? And where are we going now?
11
We are in the esophagus now. We are going to the stomach, so get ready.


12
Oh, there is a lot of liquid here, what is this liquid?
13
These are stomach acids and digestive juices that change food into a soupy liquid. Food stays in the stomach for a few hours, then it moves to the small intestine.
Stomach
14
Now, we are in the small intestine. It is a long winding tube with a length of more than 6 meters.
15
Oh, the food takes a long journey in the human body. So, what happens here?
Small Intestine
16
Most of the digestion processes happen here, where nutrients are produced and absorbed by the body.


17
Now, we are entering the large intestine. It is a wide tube, where water is absorbed and the undigested food gets out the body from the anus.
18
Oh, now I understand, but the smell is bad here. Let's go back please.
19
Yeah, it is the smell of the wasted food. Let's go back quickly.
Small Intestine
Large Intestine
20
Digestion helps us to get the energy we need from food.
21
It's a long journey that starts with the mouth and ends with anus.
22
Great, Adam. Let me show you an experiment that explains what happens in the stomach.



23
Why did you cut the apple?
24
Because food enters the stomach in small pieces.
25
We will put small pieces of an apple in the acid and wait for a few hours.
After a Few Hours
26
Amazing! It's like magic!
27
Hahaha, I didn't use the magic stick.
28
Now I understand everything.

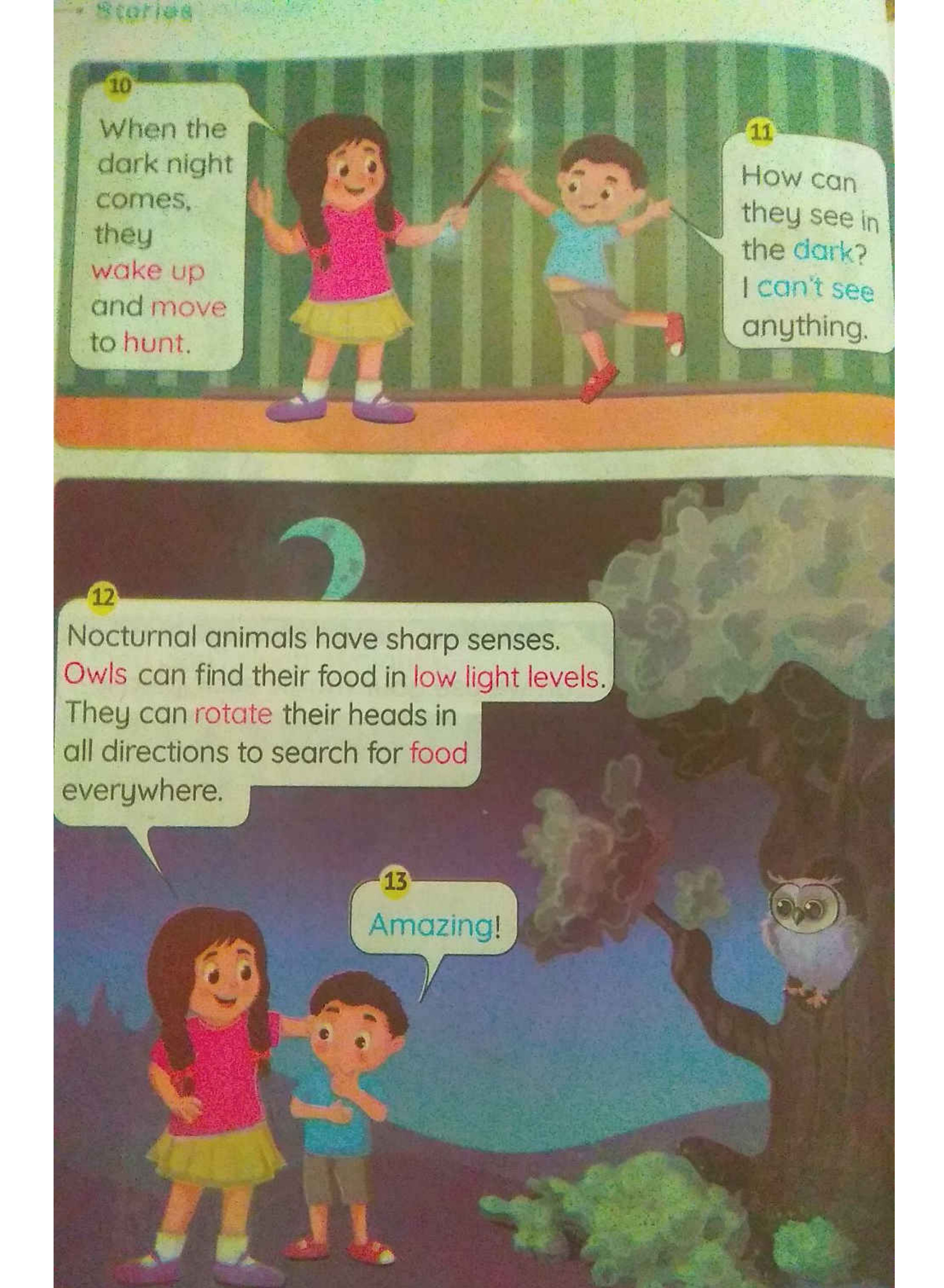
6 Nocturnal Animals

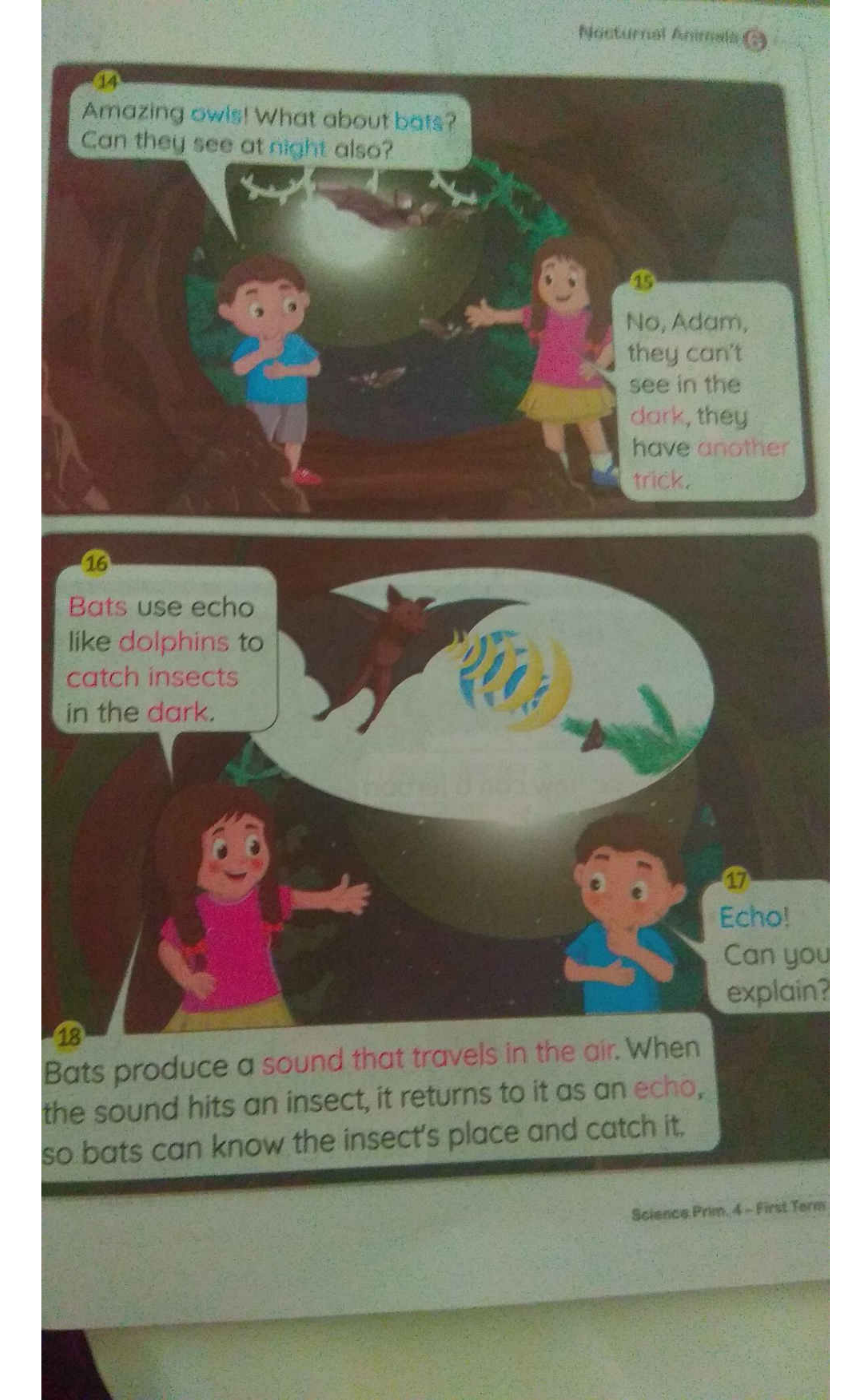


4
Nocturnal animals!
What are those?

5
They are animals that sleep during the day and wake up at night.
The night for them is like the day for us.

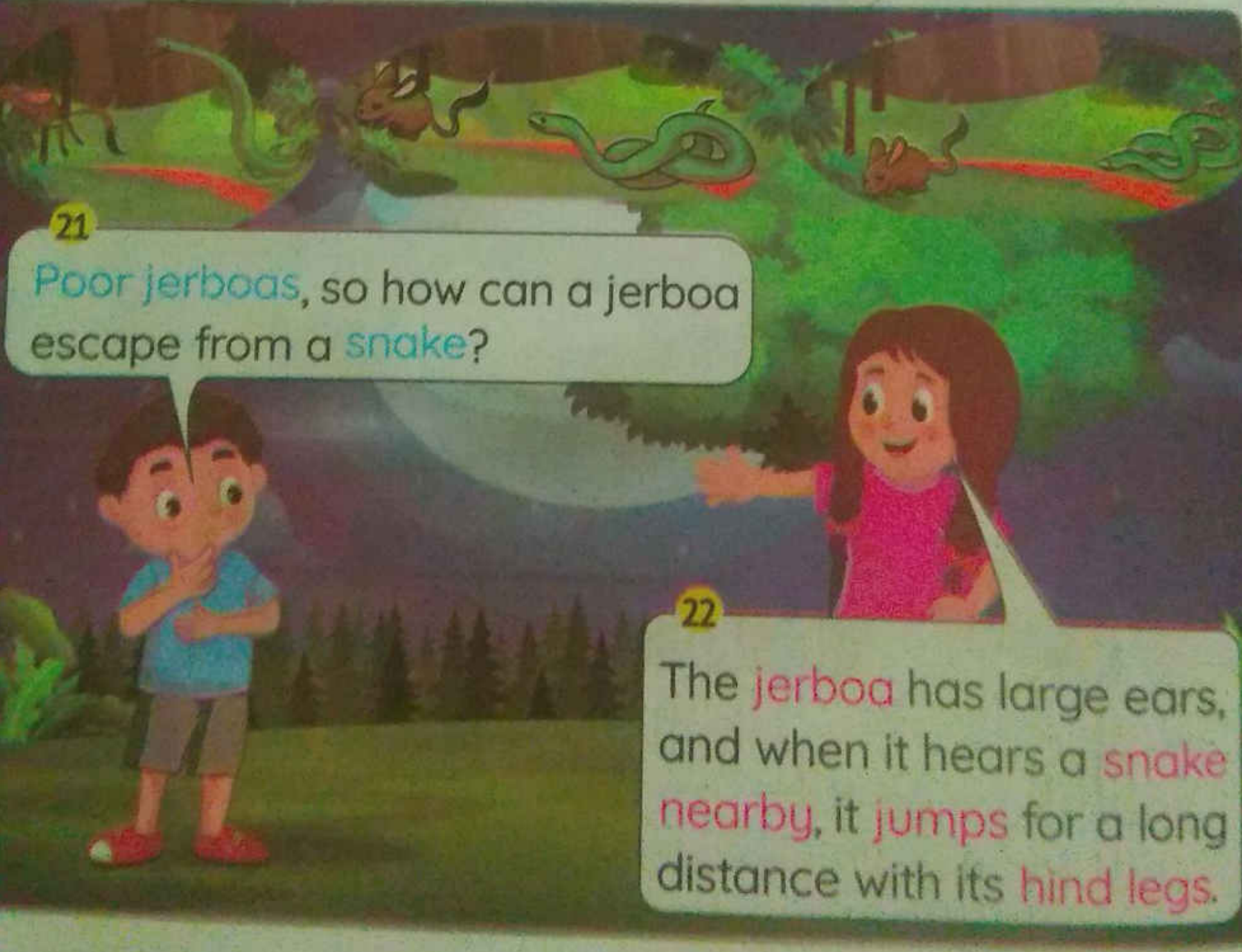

6
Are there other nocturnal animals?
7
There are a lot of them, like owls, bats, snakes, and jerboas.
8
Can we use your magic stick, please?
9
It is too late, but let's have some fun.

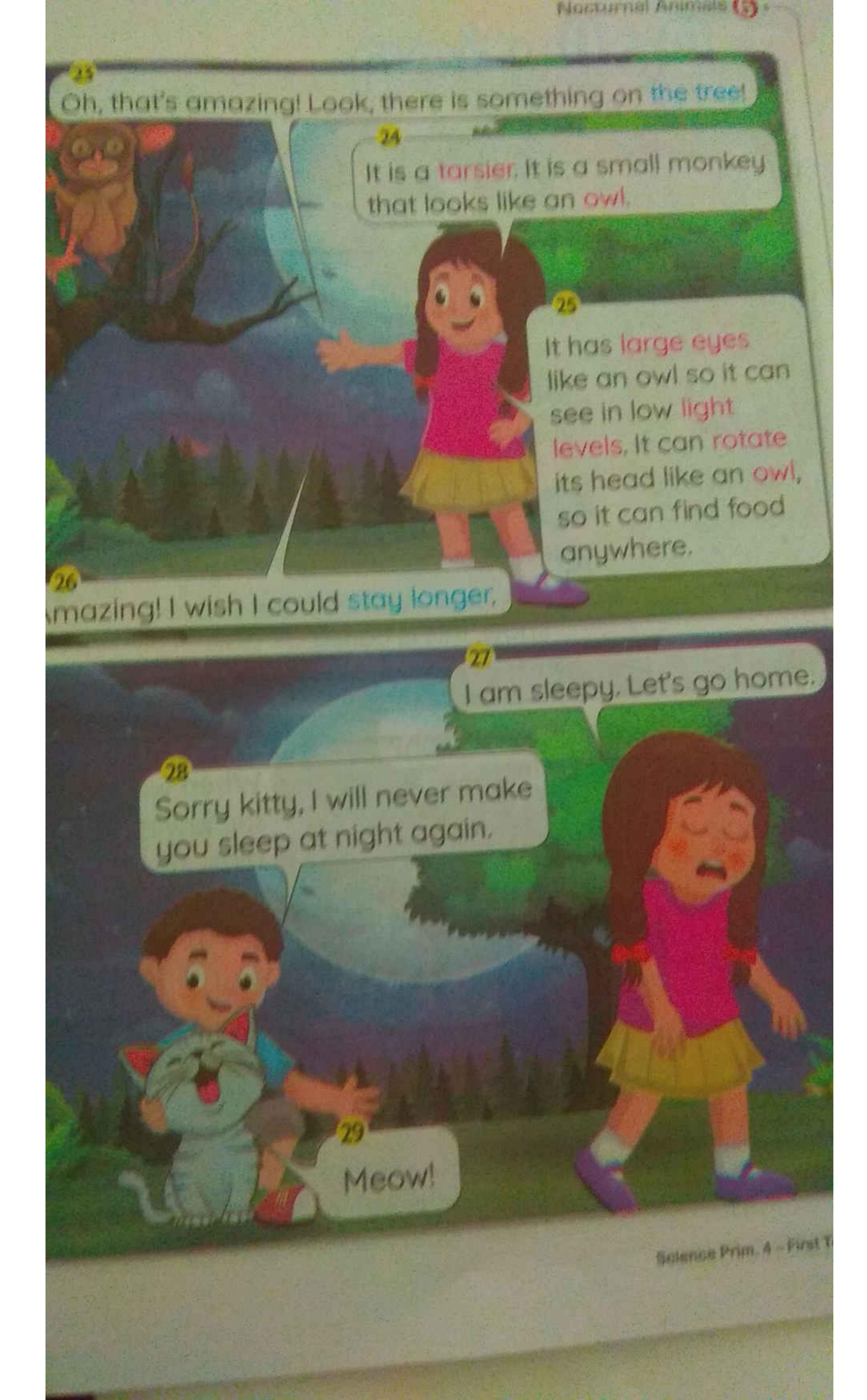

10
When the dark night comes, they wake up and move to hunt.
11
How can they see in the dark? I can't see anything.
12
Nocturnal animals have sharp senses. Owls can find their food in low light levels. They can rotate their heads in all directions to search for food everywhere.
13
Amazing!


Nocturnal Animals 6
14 Amazing owls! What about bats? Can they see at night also?
15 No, Adam, they can't see in the dark, they have another trick.
16 Bats use echo like dolphins to catch insects in the dark.
17 Echo! Can you explain?
18 Bats produce a sound that travels in the air. When the sound hits an insect, it returns to it as an echo, so bats can know the insect's place and catch it.
Science Prim. 4 - First Term

19 Amazing! What about snakes?

20 Snakes are like bats, they can't see in the dark, but they can sense the heat of their prey. At night, they search for jerboas to eat.

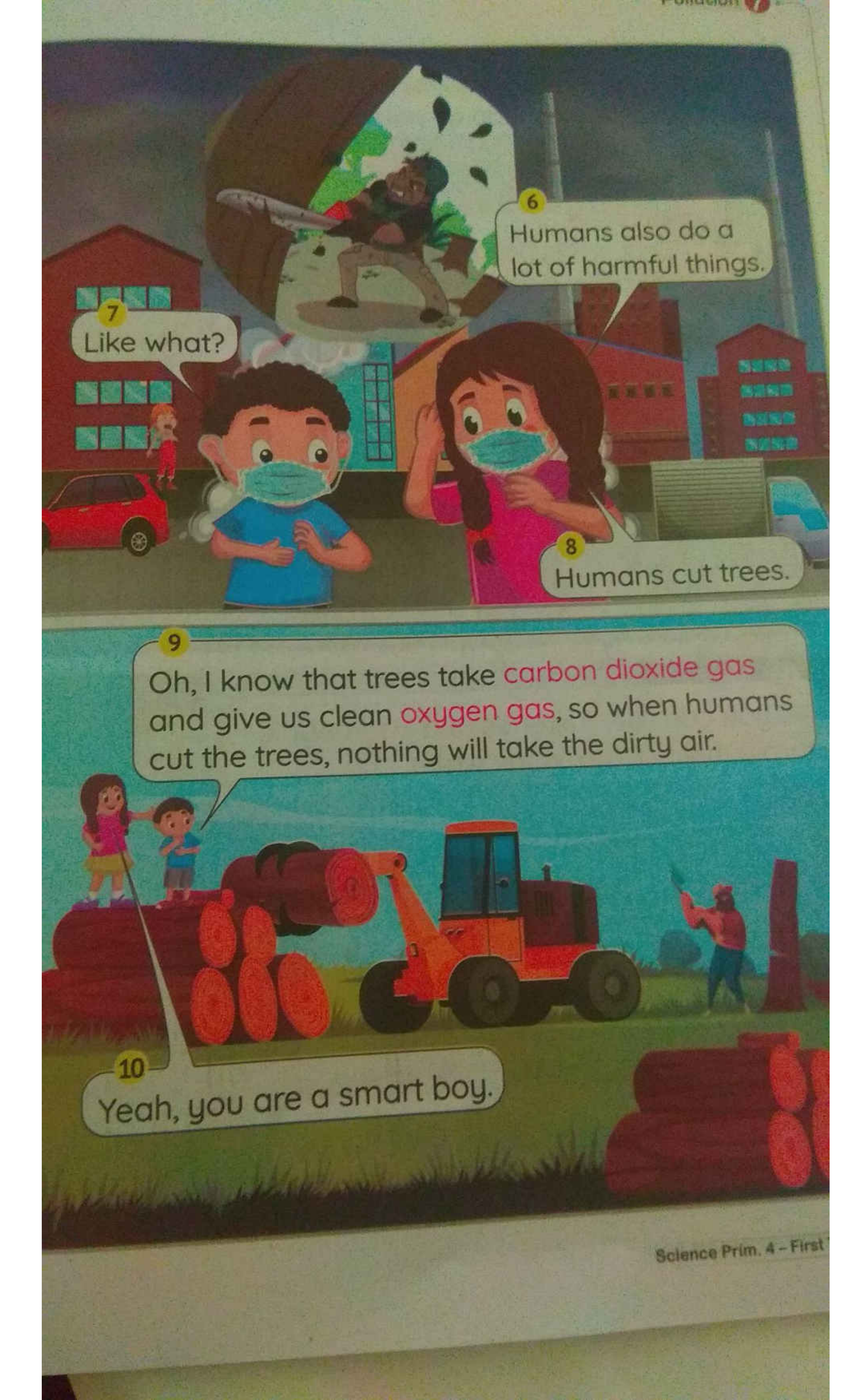



23
Oh, that's amazing! Look, there is something on the tree!
24
It is a tarsier. It is a small monkey that looks like an owl.
25
It has large eyes like an owl so it can see in low light levels. It can rotate its head like an owl, so it can find food anywhere.
26
mazing! I wish I could stay longer.
27
I am sleepy. Let's go home.
28
Sorry kitty, I will never make you sleep at night again.
29
Meow!

7 Pollution


1
Oh, I am not fine, I can't even breathe or see.
2
Yes, your eyes became red. You know, this is called air pollution.


3
What is the meaning of pollution?
4
When we make the environment dirty, this is called pollution. Let me show you.
5
Look, a lot of smoke comes out of factories and cars.

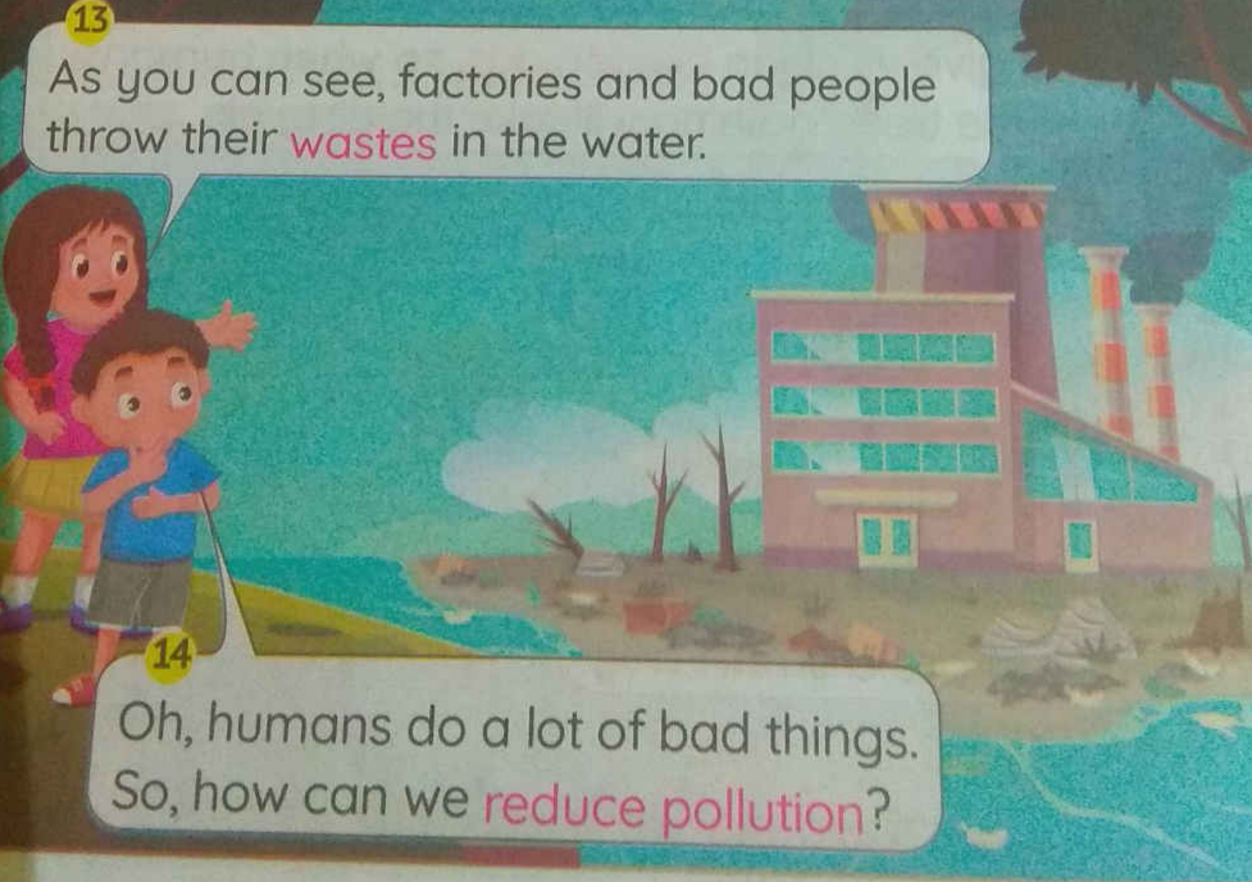

6
Humans also do a lot of harmful things.
7
Like what?
8
Humans cut trees.
9
Oh, I know that trees take carbon dioxide gas and give us clean oxygen gas, so when humans cut the trees, nothing will take the dirty air.
10
Yeah, you are a smart boy.

11

Did you know that water pollution is more dangerous than air pollution?

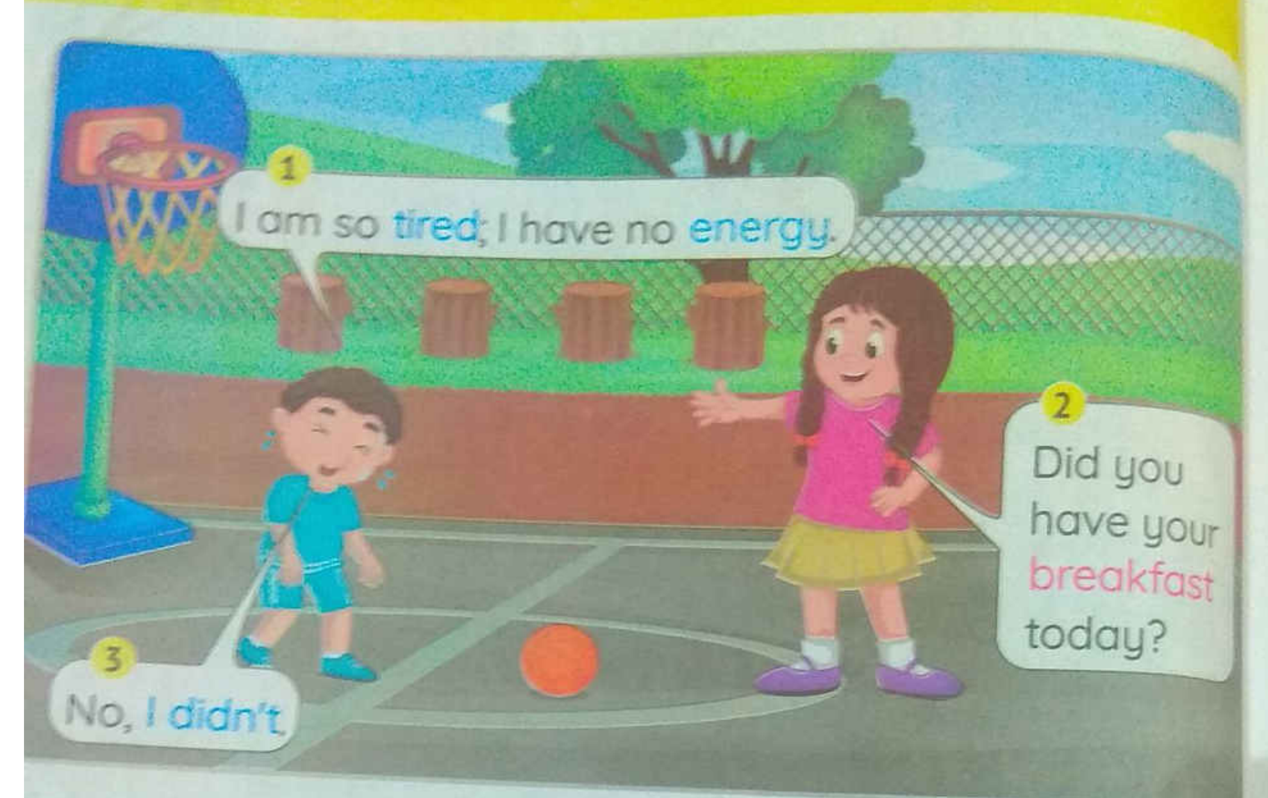
12

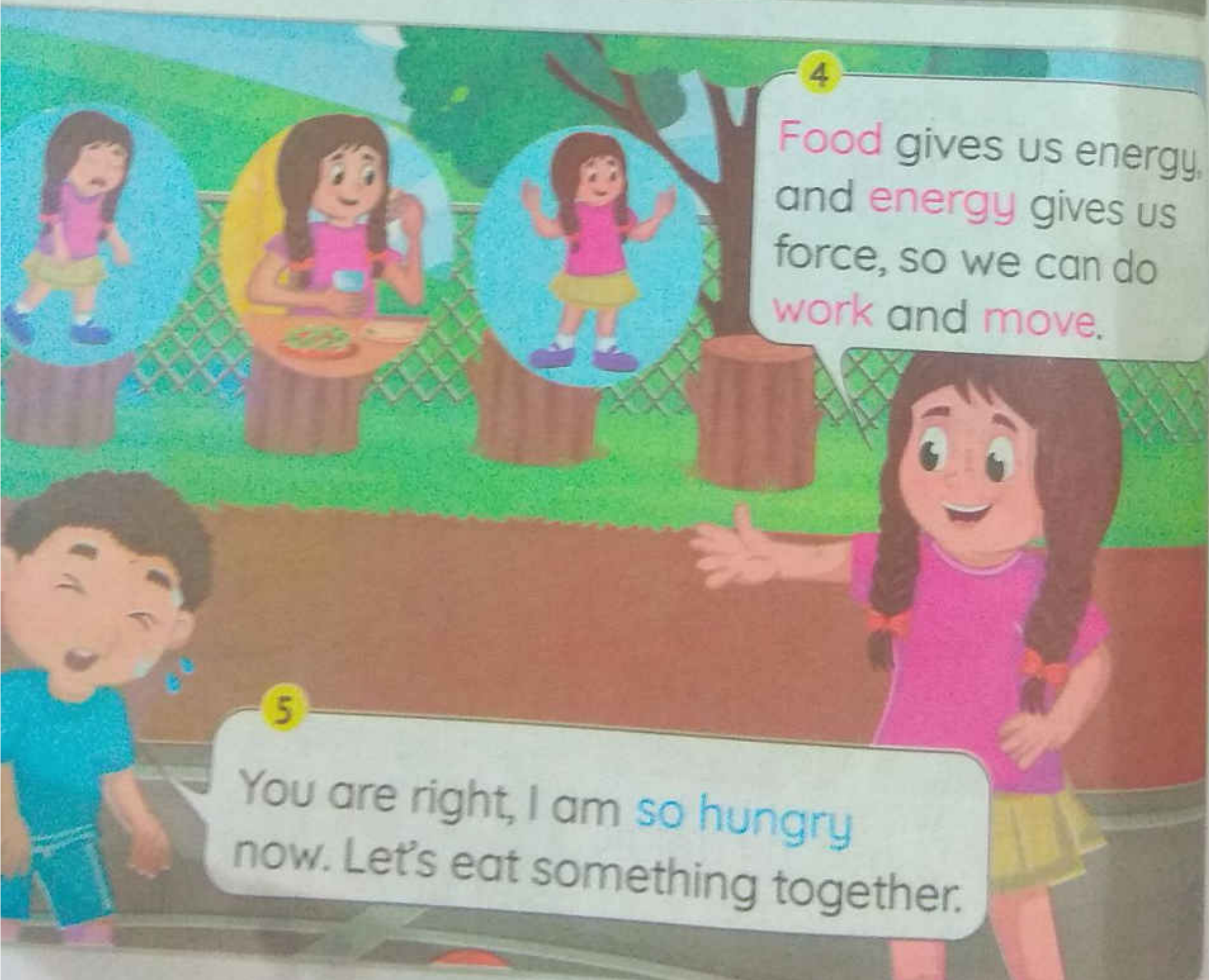
Yeah, because fish die, but how is water polluted?



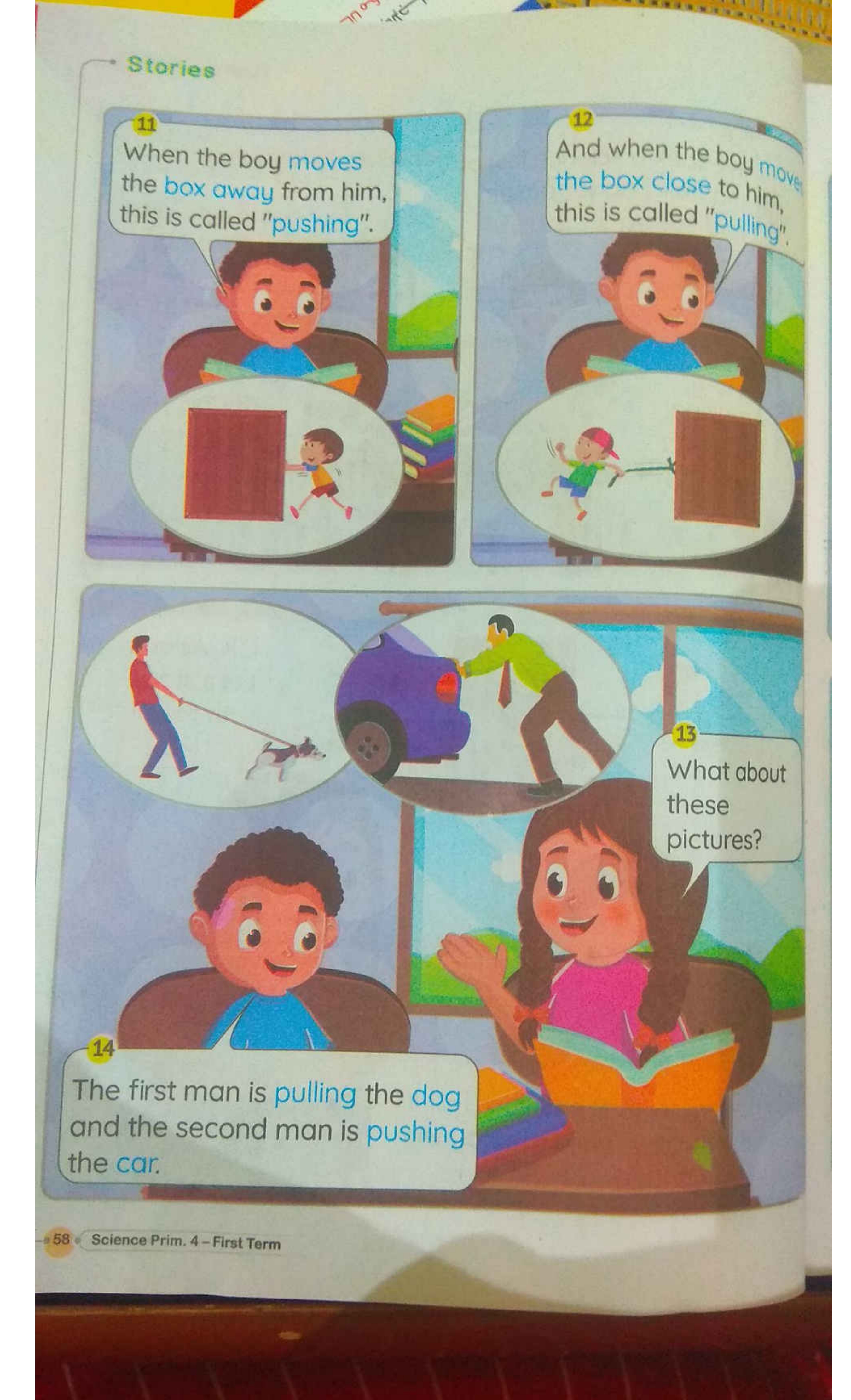

We shouldn't throw wastes in the water.
We should ride bikes instead of driving cars.
We should grow more and more trees.
16
Amazing! Let's go home.
I am very excited about growing
new plants in our home garden.
17
OK, let's use the magic
stick to go home.

8 Push and Pull

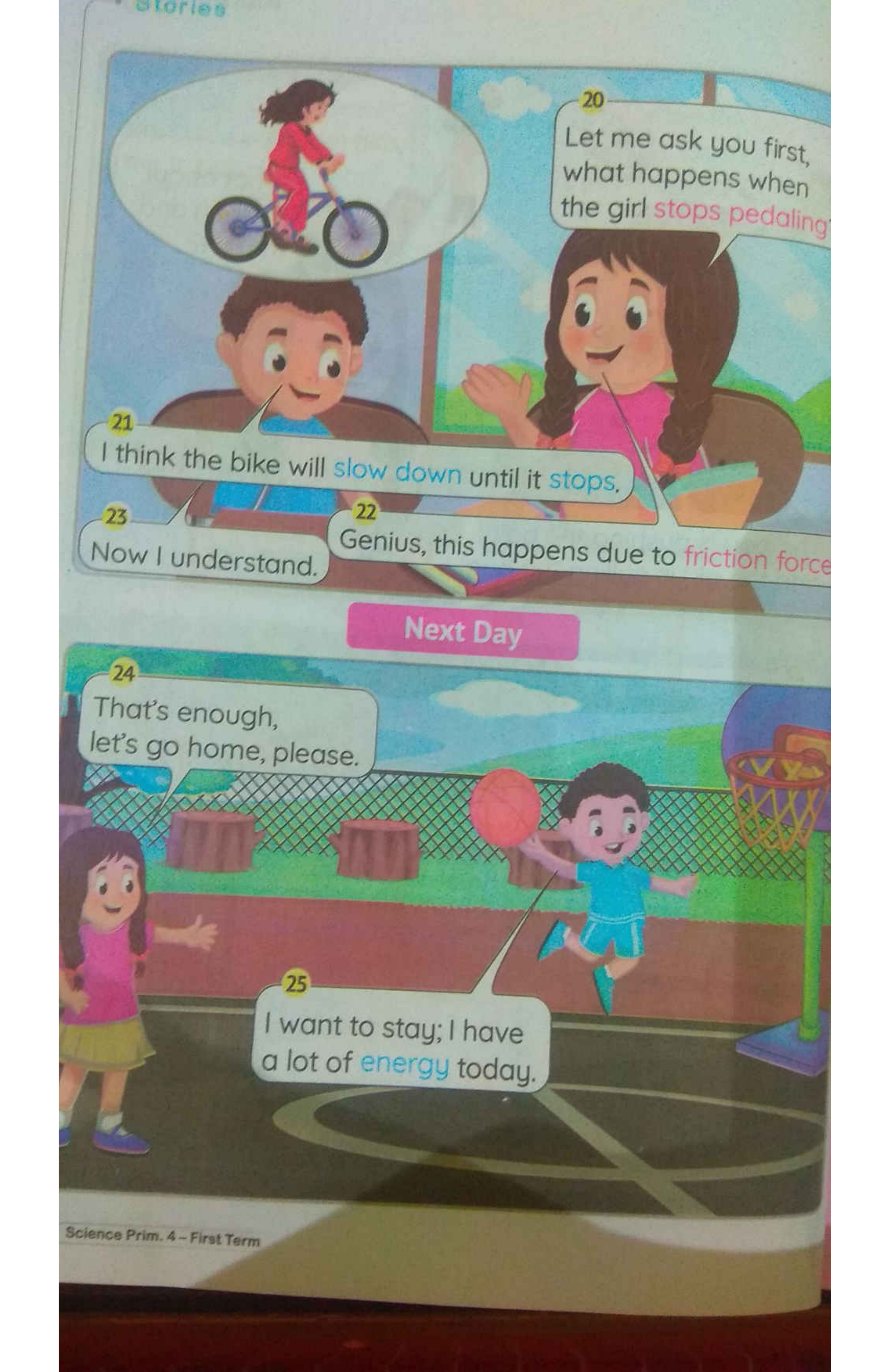


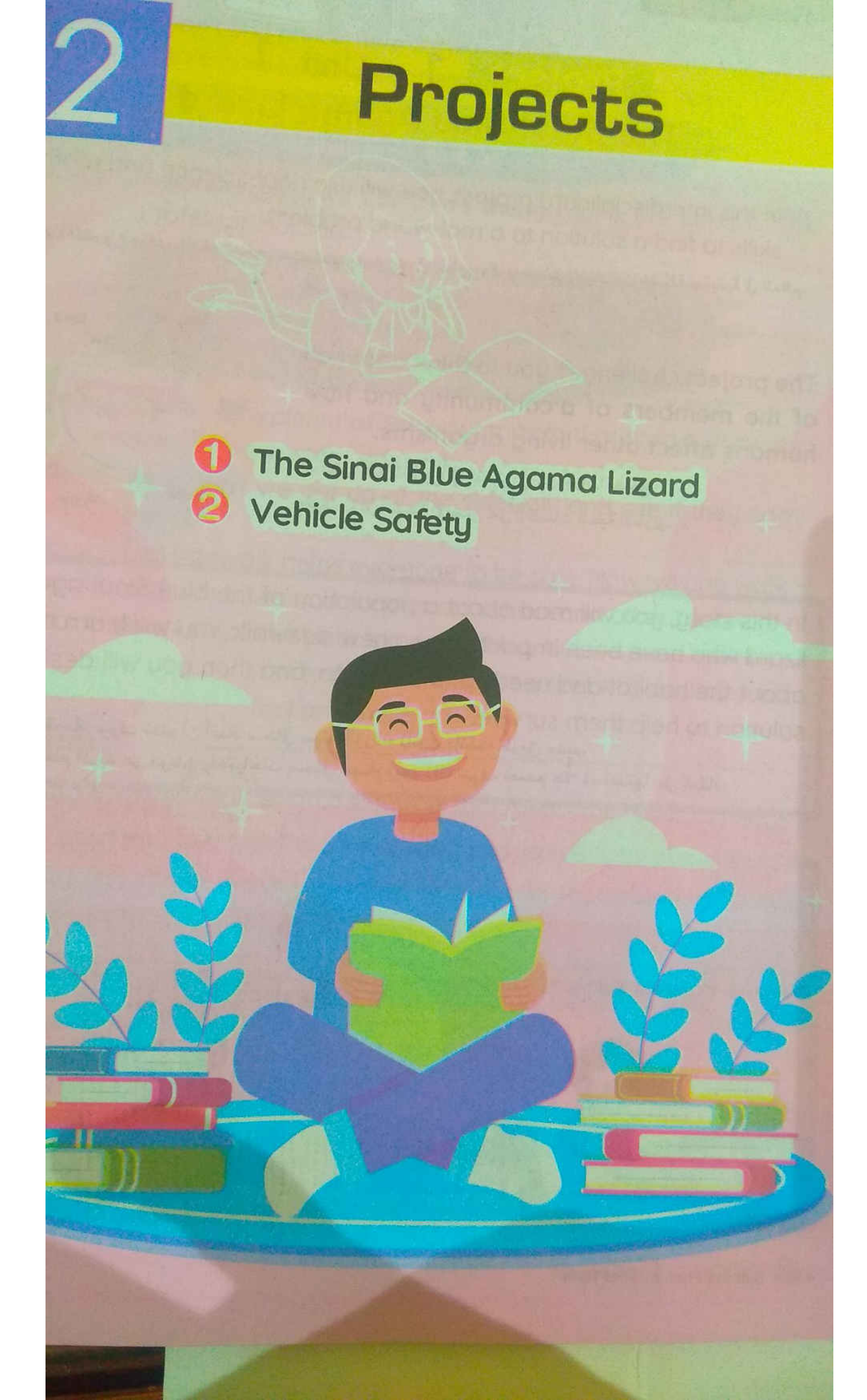



6
We took a science lesson that talks about pushing and pulling forces.
7
Great, let's play an amazing game. I will show you some pictures, and you can say "push" or "pull".
8
Amazing! Let's start.
9
OK, Adam. Let's start with the first picture.
, the boy with the yellow T-shirt
shes the box, while the boy with
green T-shirt pulls the box.


Stories
11
When the boy moves the box away from him, this is called "pushing".
12
And when the boy moves the box close to him, this is called "pulling".
13
What about these pictures?
14
The first man is pulling the dog and the second man is pushing the car.


15
What about the boy and the girl?
16
The boy is pushing the ball and the girl is pulling the bag.
17
Excellent, Adam. Do you know anything about gravity?
18
Gravity of Isaac Newton, the scientist? When the apple fell from the tree?
19
Yes, Adam. Gravity always pulls objects toward Earth.


20
Let me ask you first, what happens when the girl stops pedaling
21
I think the bike will slow down until it stops.
22
Genius, this happens due to friction force
23
Now I understand.
Next Day
24
That's enough, let's go home, please.
25
I want to stay; I have a lot of energy today.



2 Projects

1. The Sinai Blue Agama Lizard
2. Vehicle Safety



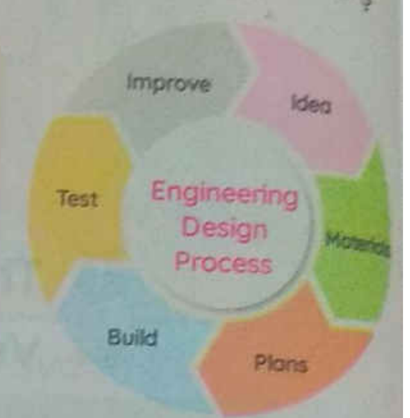
Project 1 Unit 1
The Sinai Blue Agama Lizard

» In this interdisciplinary project, you will use your science and math skills to find a solution to a real-world problem.

في هذا المشروع متعدد التخصصات، ستستخدم مهاراتك في العلوم والرياضيات لإيجاد حل لمشكلة حقيقية في العالم.

The project challenges you to think about all of the members of a community and how humans affect other living organisms.

يساعدك هذا المشروع في التفكير في كل أفراد المجتمع وكيف تؤثر أنشطة الإنسان على الكائنات الحية الأخرى.



In this story, you will read about a population of the blue Sinai agama lizard who have been impacted by a new sidewalk. You will learn more about the habitat and needs of the agama, and then you will design a solution to help them survive.

في تلك القصة، سوف تعلم أن أعداد سحالي سيناء الزرقاء تأثرت بإنشاء طريق جديد.
سوف تتعلم المزيد عن موطن واحتياجات سحالي سيناء وبعد ذلك سوف تصمم حلًا لمساعدتها على البقاء.

Maher, Laila, and Galal are looking for the Sinai agama lizards that they usually see on their walk home from school.

Laila asks: I can't find any. Where'd they all go?

Maher says: Professor Hassan said there were lots of them here.

They keep searching, but don't find any lizards.
As they grow tired of looking,

Laila says: I wonder why we can't find them. I think we need to ask Professor Hassan.

Maher and Galal smile as all three start to run down the sidewalk to her house.
The friends talk over each other as they explain the problem to Professor Hassan.

Laila says: There were plenty of Sinai agamas in that area before they built the new, wider sidewalk.

Galal asks: Why don't we get rid of the sidewalk and see if they come back?

Laila says: The sidewalk helps everyone to be safe. Now we can walk and ride bikes and scooters to school and other places.

Professor Hassan says: The path is a good thing, but we need to find out more about Sinai agama and why you couldn't find any there.

Problem

- Finding a solution to design a sidewalk that meets the humans needs and helps them to return the Sinai blue agama lizards to their homeland.

إيجاد حل لتصميم ممشى يلبي احتياجات الإنسان ويساعده في عودة سحالي سيناء (العجمة الزرقاء) إلى موطنها.




Materials List (per group)

1. Building materials, such as craft sticks or small pieces of wood.
مواد البناء (مثل العصي أو القطع الخشبية).
2. Construction paper or cardboard
ورق مقوى أو ورق كرتون
3. Pebbles, small rocks, and/or clay
حصى - صخور صغيرة أو صلصال
4. Sand, small sticks and leaves
رمل، العصي الصغيرة، أوراق أشجار
5. Toy animals
ألعاب على شكل حيوانات
6. Blank paper or poster board
ورق فارغ أو لوح ملصقات

Follow these steps with your teammates:

1. **Review the Challenge:** Study the requirements from the school and the needs of the Sinai agama.
2. **Assign Group Roles:** Decide the roles for the members of your group and record the names next to each role.
3. **Sketch Ideas:** After brainstorming, as a team, select three or four ideas to plan out in the Sketching Our Design boxes. Review your sketches and decide on one design to fully develop. Add more details to make it your blueprint that you will use to help you create your solution.
4. **Plan and Build:** Gather materials and begin building your prototype. Make sure to keep track of your steps and process.
5. **Reflect and Present:** When finished, review your product and your process. Identify ways you could improve. Prepare to share with your class.

اتبع هذه الخطوات مع زملائك في الفريق:

1. **استعرض التحدي:** ادرس متطلبات المدرسة واحتياجات سحلية العجمة بسيناء.
2. **توزيع الأدوار:** حدد الأدوار لأعضاء مجموعتك وسجل الأسماء بجوار كل دور.
3. **تخطيط الأفكار:** بعد العصف الذهني حدد ثلاثة أو أربعة أفكار لرسم مخطط لها في مربعات التخطيط ثم راجع الرسومات التخطيطية الخاصة بك وحدد تصميمًا واحدًا لتطويره بالكامل.
ثم أضف المزيد من التفاصيل للتصميم لتجعله النموذج النهائي الذي ستستخدمه للوصول إلى حل المشكلة.
4. **ابتكار نموذج أولي:** تأكد من تنفيذ العملية بشكل صحيح لبناء النموذج الأولي.
5. **التأمل والعرض:** عند الانتهاء، قم بمراجعة المنتج والعملية التي قمت بها. حدد الطرق التي يمكنك تحسينها.
استعد للمشاركة مع زملائك في الفصل.

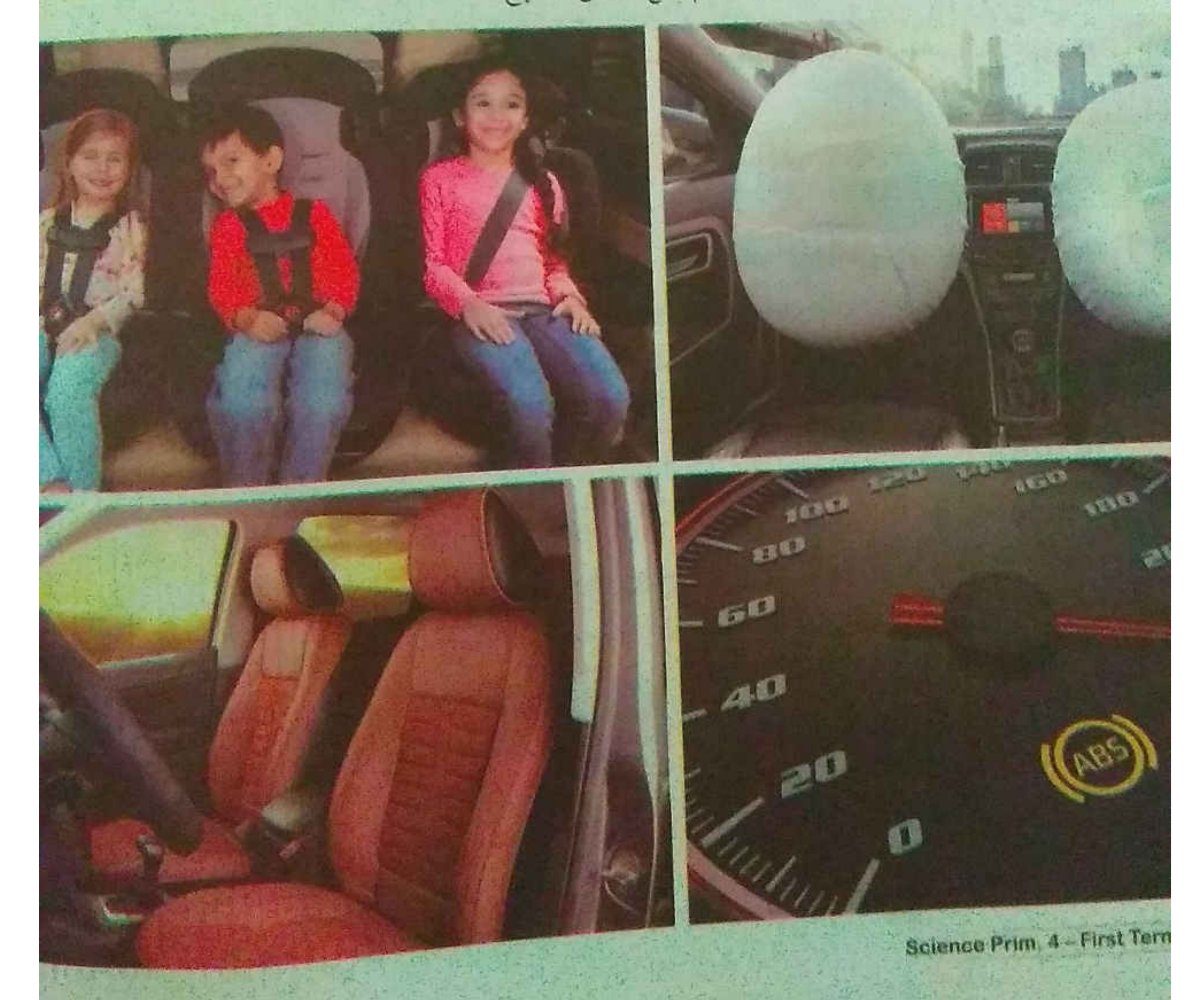
Project 1 Unit 2
Vehicle Safety

Introduction

- Car makers design vehicles for safety using modern technology.
يصمم صانعو السيارات المركبات بما يوفر أقصى درجات السلامة بالاستعانة بالتكنولوجيا الحديثة.
- Car makers are always looking for new ways to keep drivers and passengers safe.
يبحث صانعو السيارات دائمًا عن وسائل جديدة للحفاظ على سلامة السائقين والركاب.

Examples of Safety Equipment in Cars

- Seatbelts, airbags, head restraints and ABS.
حزام الأمان والوسائد الهوائية ومساند الرأس ونظام منع انغلاق المكابح.



Airbags

1 Importance: (Advantages)

- Although seatbelts are used to keep the person in place, sometimes they are not enough. Therefore, airbags are designed to protect passengers so that they do not crash into the body of the car or fly forward outside the vehicle during a collision.

بالرغم أن أحزمة الأمان تستخدم لتثبيت الراكب في مكانه فلا يصطدم بعجلة القيادة أثناء التصادم لكنها في بعض الأحيان غير كافية ولذلك صممت الوسائد الهوائية لحماية الركاب حتى لا يصطدموا بجسم السيارة الصلب أو يطيروا إلى الأمام خارج المركبة.

2 Disadvantages:

- Sometimes they can cause severe injuries to the face or chest
- There may be a sensor malfunction that may lead to the airbag being released at an inappropriate time, such as passing over a sudden bump or not opening the airbag in a collision.

قد تتسبب في بعض الأحيان في حدوث إصابات بالغة بالوجه أو الصدر.

قد يوجد هناك عطل في المستشعر مما يؤدي لإطلاق الوسادة الهوائية في وقت غير مناسب مثل المرور فوق مطب مفاجئ أو عدم فتح الوسادة عند حدوث التصادم.

3 Improvement:

- The design is simplified and the weight of its components is reduced, making it more flexible and efficient

تم تبسيط التصميم وتقليل وزن مكوناتها مما يجعلها أكثر مرونة وكفاءة.

4 Results:

- It is impossible to design cars that are safe in all types of collision situations, but car makers looking to develop car protection equipment.

لا يوجد تصميم للسيارة آمن في جميع حالات التصادم ومع ذلك يبحث صانعو السيارات تطوير وسائل حماية السيارات





» You have learned about airbags and how they keep people safe.

» Now, conduct research online about the latest safety feature other than airbags, such as:

- Blind Spot Monitoring System
- Driver Override Technology
- Night Vision System
- Traffic Sign Recognition System

« لقد تعلمت عن الوسائد الهوائية وكيف تحافظ على سلامة الركاب.

« الآن، قم بإجراء بحث عبر الإنترنت حول أحدث ميزات الأمان بخلاف الوسائد الهوائية، مثل: نظام مراقبة النقط العمياء - تكنولوجيا تجاوز السائق - نظام الرؤية الليلية - نظام التعرف على إشارات المرور.

Your research must include the following:

1. A plan to develop this mechanism.
2. Describe the impact of the collision on the activation of the device system.
3. Who benefits most from the protection mechanism?
4. How to develop this mechanism?

يجب مراعاة أن يشتمل البحث على الآتي:

1. خطة لتطوير تلك الآلية.
2. وصف تأثير التصادم في تفعيل نظام الجهاز.
3. من المستفيد الأكبر من آلية الحماية؟
4. كيفية تطوير تلك الآلية؟

3 Performance Tasks

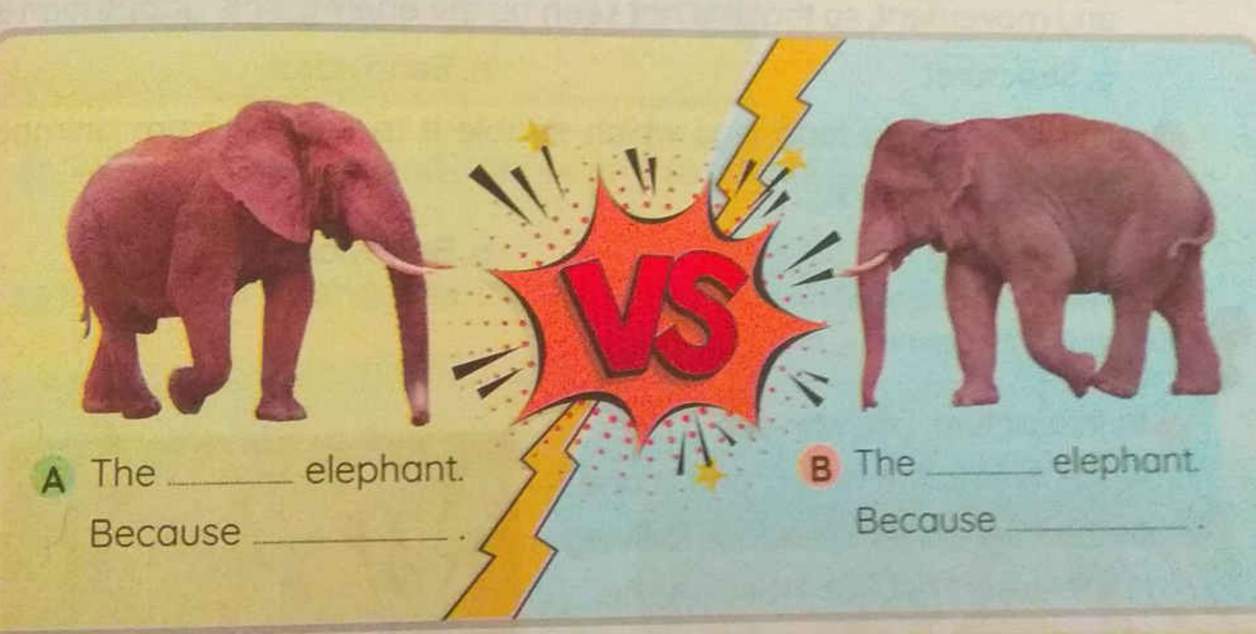
General Instructions

- The tasks are to be distributed, administered and assessed in two successive classes (one period).
- The teacher is to distribute the tasks and explain what to do in each task.
- Students can use the student's book.



1 African and Asian Elephants

- For most of us, most elephants are similar to each other; so, humans can't differentiate between them. This is different for scientists. There are two main types of elephants: the African elephant and the Asian elephant.
- If you know that the African elephant can live in hot temperature environments, but the Asian elephant can live in mild temperature environments, which one of these is the African elephant and which one is the Asian elephant? Why?



A The ________ elephant.
Because ________.

B The ________ elephant.
Because ________.

- Nowadays, wildlife experts agree that the elephants are in danger as a result of the destruction of their natural homes to be used for farming or to construct buildings, as well as being hunted by hunters to get their tusks for ivory trade.

Write some suggestions for protecting the elephants from the effects of human activities. Use these guiding words:

- Stating laws to prevent ________
- Stopping from ________

2 Where Does It Live?

A



Observe this picture.

1. Predict where this animal with big ears lives:
   (a) In a hot desert habitat.
   (b) In a cold polar environment.
2. What is your evidence for that?

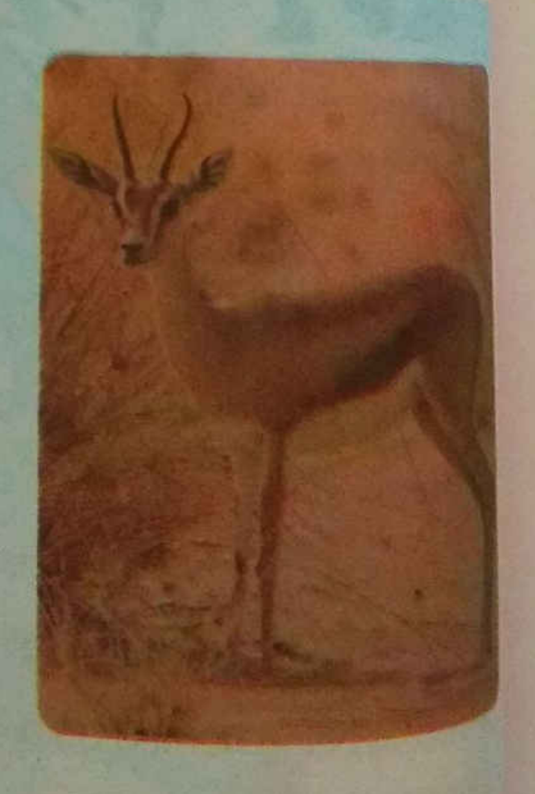
   ....

3. When this animal sees its enemy from other animals, it stands without any movement, so that it is not seen by the enemy. This adaptation is:
   a. Structural b. Behavioral
4. This animal has long legs which enable it to escape from animals. This adaptation is:
   a. Structural b. Behavioral



B

In this picture, you can see a deer which lives in the desert and is one of the animals which adapt to living in the desert habitat. Observe the picture and determine:



1. The kind of adaptation which enables it to run very fast:
   a. Structural b. Behavioral
2. This deer is active at night to get food and avoid enemies. This adaptation is:
   a. Structural b. Behavioral

3 Can the Polar Bear Live in Hot Habitat?



1. You studied that the polar bear adapts to live in very cold habitats. Why can't the polar bear live in the hot desert?

____
____
____
____
____

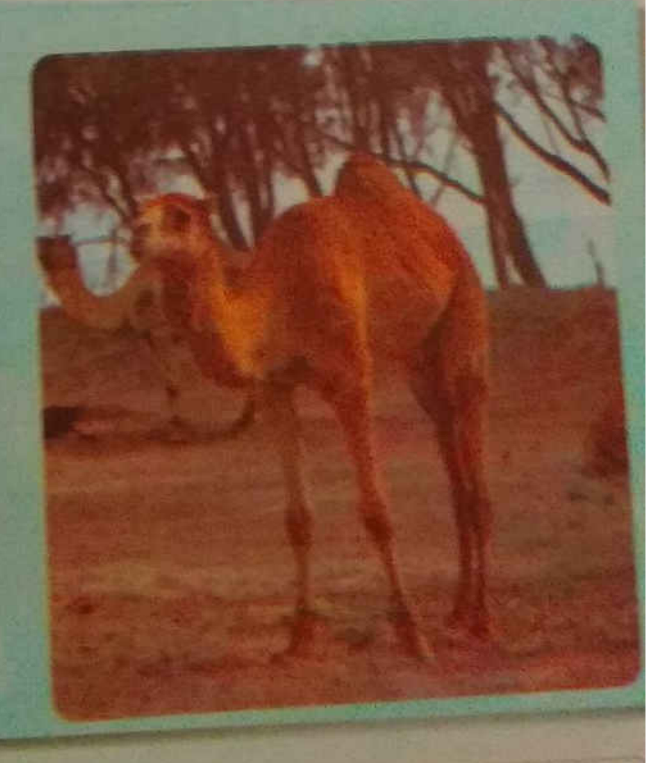
2. What changes should happen to this animal to be able to live in the hot desert?

» Its fur color changes to ______________________

3. Think and predict: if the polar bear moves to live in the camel's desert habitat, will its life continue?

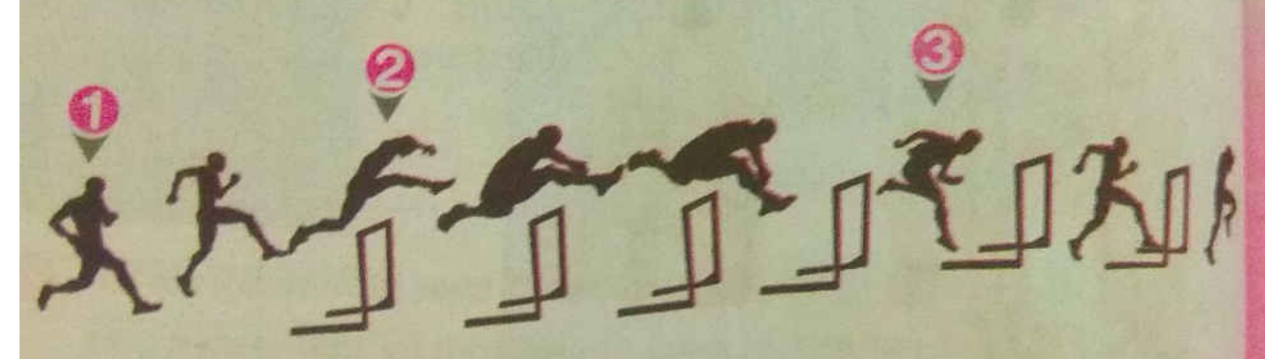
a. Yes

b. No



4 A Sports Competition

ou can see a sports competition. What can you observe in the energy transfer (potential energy- kinetic energy) when the player crosses the obstacles?



From this figure, determine the type of energy across the stages in which the player crosses the obstacles

Position	Acquired Energy
Position 1	....
Position 2	....
Position 3	....

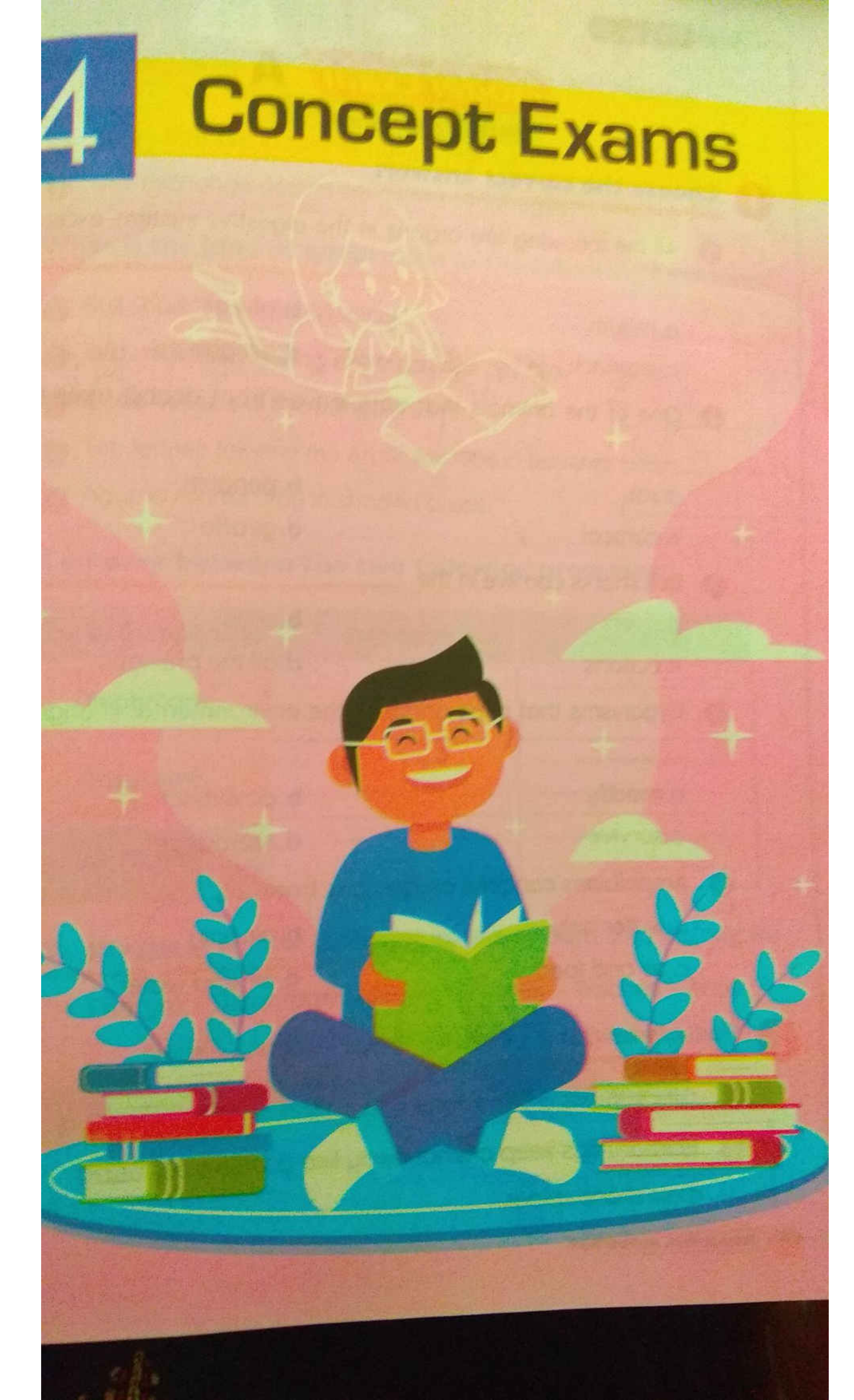
which position is there the greatest potential energy?

....

which position is there the greatest kinetic energy?

....

4 Concept Exams





Unit (1) Concept (1)

1 Choose the correct answer:

1. The acacia tree sends ________ messages when a giraffe starts to eat its leaves.
   a. impulses b. smelly
   c. watery d. air
2. Fish use their ________ to extract oxygen from water.
   a. tails b. lungs
   c. gills d. eyes
3. The organ that moves the food into the stomach is the ________
   a. tongue b. esophagus
   c. trachea d. liver
4. Carbon dioxide gas is ejected out of the body through ________
   a. inhalation b. exhalation
   c. digestion d. reproduction
5. The fur of a fennec fox protects it from ________ .
   a. wind b. rain
   c. hot weather d. cold weather

Put (✓) or (✗):

1. The palm tree has tiny leaves like the water lily plant. (
2. Camels' humps store fats to adapt to the extreme hot climat (
3. A penguin has scales to help it keep its body warm. (
4. Acacia trees and kapok trees have the same umbrella shap (
5. Humans can help in restoring the ecosystem by decreasing the number of trees. (

3 Label the following figure:

1. ....
2. ....
3. ....
4. ....
5. ....
6. ....
7. ....

4 Choose from column (A) what suits it in both columns (B) & (C):

Column (A)	Column (B)	Column (C)
1 Humans	a. live in water or on land.	a. have gills.
2 Fish	b. live on land.	b. have sensitive skin and lungs.
3 Amphibians	c. live in water.	c. have lungs.

1. .... 2. .... 3. ....



Model Exam A

Unit (1) Concept (2)

Choose the correct answer:

1. ______ use echolocation to survive in dark water.
   a. Bats b. Bull sharks
   c. Fennec foxes d. Dolphins
2. When a jerboa hears the sound of a moving snake, it ______.
   a. remains standing b. jumps to hunt the snake
   c. jumps to run away d. hides in a burrow
3. The nervous system can do all the following functions, except ______.
   a. gathering information about its surroundings
   b. getting the energy needed from food
   c. telling the body about what to do
   d. keeping living organisms away from danger
4. The organ that processes the information is the ______.
   a. nerve b. spinal cord
   c. sensory organ d. brain
5. Bats use their ______ to get information about their surroundings in the dark.
   a. noses b. ears
   c. eyes d. skin

Put (✓) or (✗):

- Dolphins use countershading to hunt in dark water. (
- Pressing the brakes when you see a red traffic light is a visual response. (

3. Snakes can sense their prey through their sharp hearing sense. ( )
4. The visual response is slower than the auditory response. ( )
5. Some nocturnal animals have poor night vision, but they can still hunt at night. ( )

3 Arrange the following steps:

1. (.....) Echo reflects back from the jellyfish.
2. (.....) The sound waves transfer through water.
3. (.....) A dolphin can detect the location of a jellyfish.
4. (.....) The dolphin produces sound waves.
5. (.....) Sound waves hit the body of the jellyfish

4 Choose from column (A) what suits in columns (B) & (C):

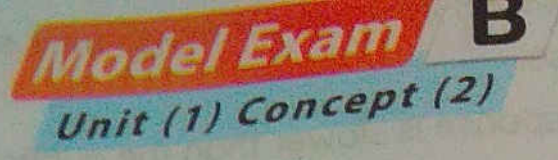
Column (A)	Column (B)	Column (C)
1 Jerboas	a. reptiles	a. have sharp sight and hearing senses.
2 Snakes	b. flying birds	b. can sense the heat of their prey.
3 Owls	c. flying mammals	c. use echo to hunt at night.
4 Bats	d. rodents	d. run in zigzag paths.

1 .... 2 .... 3 .... 4 ....

5 Classify the following words in this table:

Stomach - Brain - Nose - Spinal cord - Liver - Nerves - Alveoli - Lungs

Digestive System	Nervous System	Respiratory System
....	....	....
....	....	....



Unit (1) Concept (2)

1 Choose the correct answer:

1. The night active animals are called ………… animals.
   a. predator b. prey
   c. nocturnal d. wild
2. Egyptian jerboa is considered a desert ………… .
   a. reptile b. rodent
   c. bird d. amphibian
3. Sensory receptors are nerves found near all of the following except the ………… .
   a. tongue b. ear
   c. nose d. brain
4. The response of a jerboa to jump quickly and escape takes ………… .
   a. one second b. two seconds
   c. less than one second d. more than one second
5. A snake can sense jerboas moving at night using a special part in its ………… .
   a. face b. nose
   c. eye d. tail

Put (✓) or (✗):

1. The jerboa is considered a rodent that has a sharp hearing sense. (
2. Reaction time always takes one second or more. (
3. As the reaction time decreases, the rodent can escape from vipers. (

4. Blinking your eyes when something comes near them is an auditory response. ( )
5. The brain is responsible for processing information after receiving it. ( )

3 Classify the following situations into visual response or auditory response:

1. Stopping the car when the traffic sign becomes red. (............)
2. Escaping of jerboa when it hears the movement of a snake nearby. (............)
3. Getting attention when your friend is waving to you.(............)

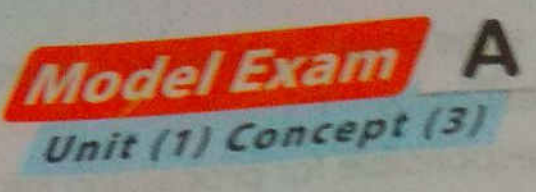
Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
Brain	a. connect all nervous system components together.
Spinal cord	b. are nerves found in the sensory organs that receive information.
Nerves	c. is located inside the backbone.
Sensory receptors	d. is the main control center of the body of living organism.

1. .... 2. .... 3. .... 4. ....

What is the kind of adaptation in the following examples?

1. Owls prefer to surprise their prey at night. (............)
2. The jerboa can jump fast by its hind legs. (............)
3. Dolphins use the echolocation property to locate their prey. (............)



1 Choose the correct answer:

1. The reflected light from an object enters the eyes through ________.
   - a. eye sockets
   - b. eye pupils
   - c. eye lenses
   - d. eye retina

2. The light waves travel in the air as ________ lines.
   - a. zigzag
   - b. curved
   - c. circular
   - d. straight

3. The ________ eyes glow in the dark.
   - a. snake's
   - b. jerboa's
   - c. fishing cat's
   - d. tarsier's

4. The sun is the main source of energy because it ________ lig
   - a. absorbs
   - b. emits
   - c. reflects
   - d. transmits

5. Which of the following is a source of light?
   - a. The mirror
   - b. The moon
   - c. The fire
   - d. The eye

Put (✓) or (✗):

1. Tarsiers and owls can't move their eyes in their sockets. (
2. The moon is considered a natural source of light. (
3. Fishing cats have a mirror-like membrane in front of their ey (
4. It is much easier for humans to see objects in dim light. (
5. Tapetum lucidum is a life-saving structural adaptation. (

3 Classify the following words in this table:

Wood - Metal - Pure water - Skin - Milk - Lenses

Transparent Mediums	Opaque Mediums
....	....
....	....

4 Choose from column (A) what suits it in column (B):

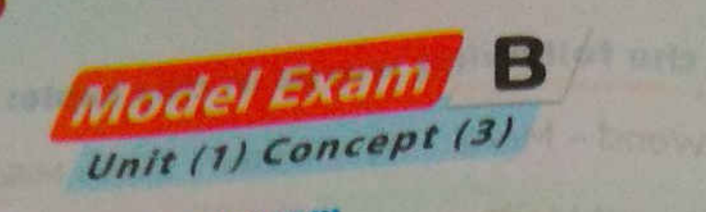
Column (A)

1. Humans
2. Owls & cats
3. Tarsiers
4. Bats & Snakes

Column (B)

a. are primate monkeys.
b. are nocturnal animals that have poor night vision.
c. are nocturnal animals that have excellent night vision.
d. use night vision goggles to see in the dark.

1 .... 2 .... 3 .... 4 ....



1 Choose the correct answer:

1. The structural adaptation that helps fishing cats to hunt at n... is their ________ .
   a. hearing sense b. short ears
   c. thick fur d. tapetum lucidum

2. The humans' eyes allow light to pass trough their pupils ________ those of cats.
   a. less than b. more than
   c. similar to c. equal to

3. Humans use ________ to see in the dark.
   a. medical glasses b. night glasses
   c. special lenses d. night goggles

4. The ________ is like a computer in processing information.
   a. eye b. heart
   c. brain d. Spinal cord

5. All the following are transparent objects, except the ________
   a. lens b. paper
   c. air d. glass

Put (✓) or (✗):

1. All nocturnal animals have spectral night vision. ( )
2. The kind of light reflection depends on the light source. ( )
3. The pupils in humans eyes open narrower than those in the eyes of cats. ( )

4. Shiny objects include mirrors, metals and glass. ( )
5. The moon is considered a natural light source. ( )

3 Study the following figures, then complete:

Figure (1) | Figure (2) | Figure (3)

a. The pupils in figure (1) open ________ than the pupils in figure (3).

b. Figure (2) can move each eye ________.

c. Figure (____) can turn its head in all directions.

d. Figure (____) needs a night vision goggles to see in the dark.

4 Arrange the following steps that represent vision:

1. (____) The brain translates this signal.
2. (____) Light falls on objects.
3. (____) The eye pupils allow the light to enter the eyes.
4. (____) Light reflects on the eyes.
5. (____) The sensory receptors at the back of the eyes send a signal to the brain.





Model Exam A

Unit (1) Concept (4)

1 Choose the correct answer:

1. Humpback whales sing during .... months, which is the mating season.
   a. winter b. summer
   c. autumn d. spring
2. A rescue flare depends on .... sense.
   a. hearing b. sight
   c. smell d. touch
3. Light patterns in Morse code can be expressed in ....
   a. symbols b. beeps
   c. flashes d. numbers
4. Nurse ants send smelly messages to scout ants if ....
   a. there is a danger nearby
   b. the food is not enough
   c. they find food
   d. they want to attract a mate
5. Thumbs-down code means that ....
   a. you are angry b. you agree
   c. you are saying yes d. you are saying no

Put (✓) or (✗):

1. Displaying light inside the fireflies bodies is considered a behavioral adaptation. (
2. Morse code can be detected by the sight sense or hearing sense. (

3. Ants communicate together using motion patterns. ( )
4. Bats can't change echo into vibrations. ( )
5. Facial expression is a code that can be received by the eyes. ( )

Classify the following according to the method that the living organism uses to communicate:

Dolphins - Fireflies - Humpback whales - Honeybees - Humans - Bats

Morse Code	Echolocation	Light Show	Dancing	Singing
....	....	....	....	....

Arrange the following steps that represent vision:

1. (......) These vibrations tell the person about nearby bodies.
2. (......) Echo is turned into vibration.
3. (......) A person can feel vibration using his/her thumb.
4. (......) The cane picks up an echo.

Complete the sentences from the following words:

(alphabet letters - sight - Morse - hearing - information)

1. Codes transfer ....
2. Flashlight codes are indicated by .... and drum codes are indicated by ....
3. Dots and dashes represent ....
4. .... code is one of the communication systems for long distances.



Model Exam B

Unit (1) Concept (4)

1 Choose the correct answer:

1. Both bats and canes ______ .
   a. produce low-pitched sounds
   b. produce high-pitched sounds
   c. change echo into vibrations
   d. can't change echo into vibrations

2. Ants use ______ sense to communicate together in case of the lack of food.
   a. hearing
   b. sight
   c. smell
   d. touch

3. Fireflies communicate by light patterns to attract ______
   a. a predator
   b. a prey
   c. an insect
   d. a mate

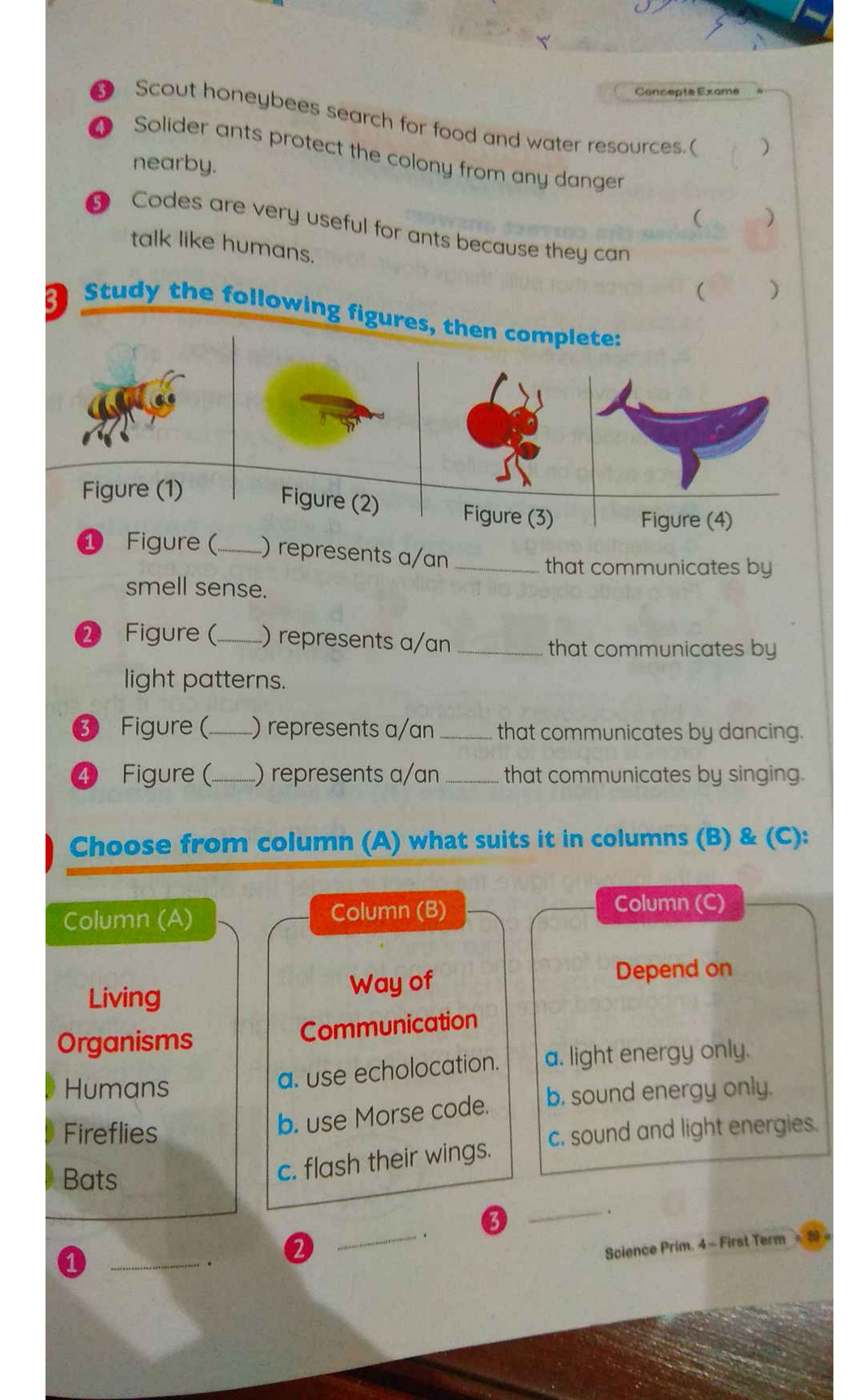
4. High-pitched sounds travel better in ______ water during the ______ season.
   a. warm - mating
   b. cold - mating
   c. warm - feeding
   d. cold - feeding

In Morse code, long flashes can be used instead of ______
   a. dots
   b. dashes
   c. dots and dashes
   d. neither dots nor dashes

: (✓) or (✗):

Without the strong sense of hearing, bats will die. (

Morse code is used by humans to communicate across long distances. (



3. Scout honeybees search for food and water resources. (   )
4. Solider ants protect the colony from any danger nearby. (   )
5. Codes are very useful for ants because they can talk like humans. (   )

3 Study the following figures, then complete:

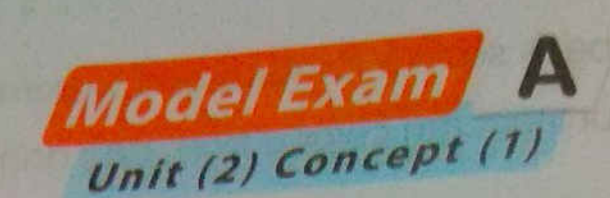
Figure (1)	Figure (2)	Figure (3)	Figure (4)

1. Figure (......) represents a/an .... that communicates by smell sense.
2. Figure (......) represents a/an .... that communicates by light patterns.
3. Figure (......) represents a/an .... that communicates by dancing.
4. Figure (......) represents a/an .... that communicates by singing.

Choose from column (A) what suits it in columns (B) & (C):

Column (A)	Column (B)	Column (C)
Living Organisms	**Way of Communication**	**Depend on**
Humans	a. use echolocation.	a. light energy only.
Fireflies	b. use Morse code.	b. sound energy only.
Bats	c. flash their wings.	c. sound and light energies.

1. ....
2. ....
3. ....



Choose the correct answer:

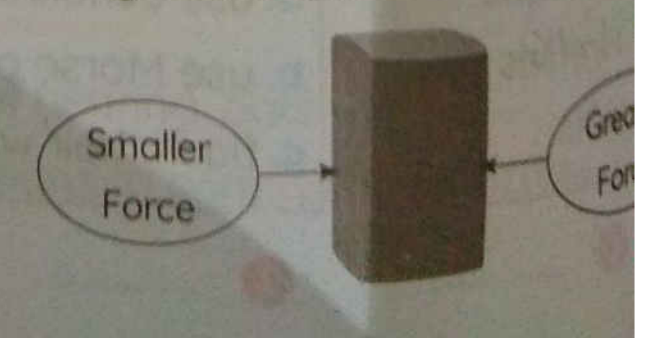
1. The force that pulls things down toward Earth's center is ....
   a. friction force
   b. gravity
   c. air movement
   d. inertia force

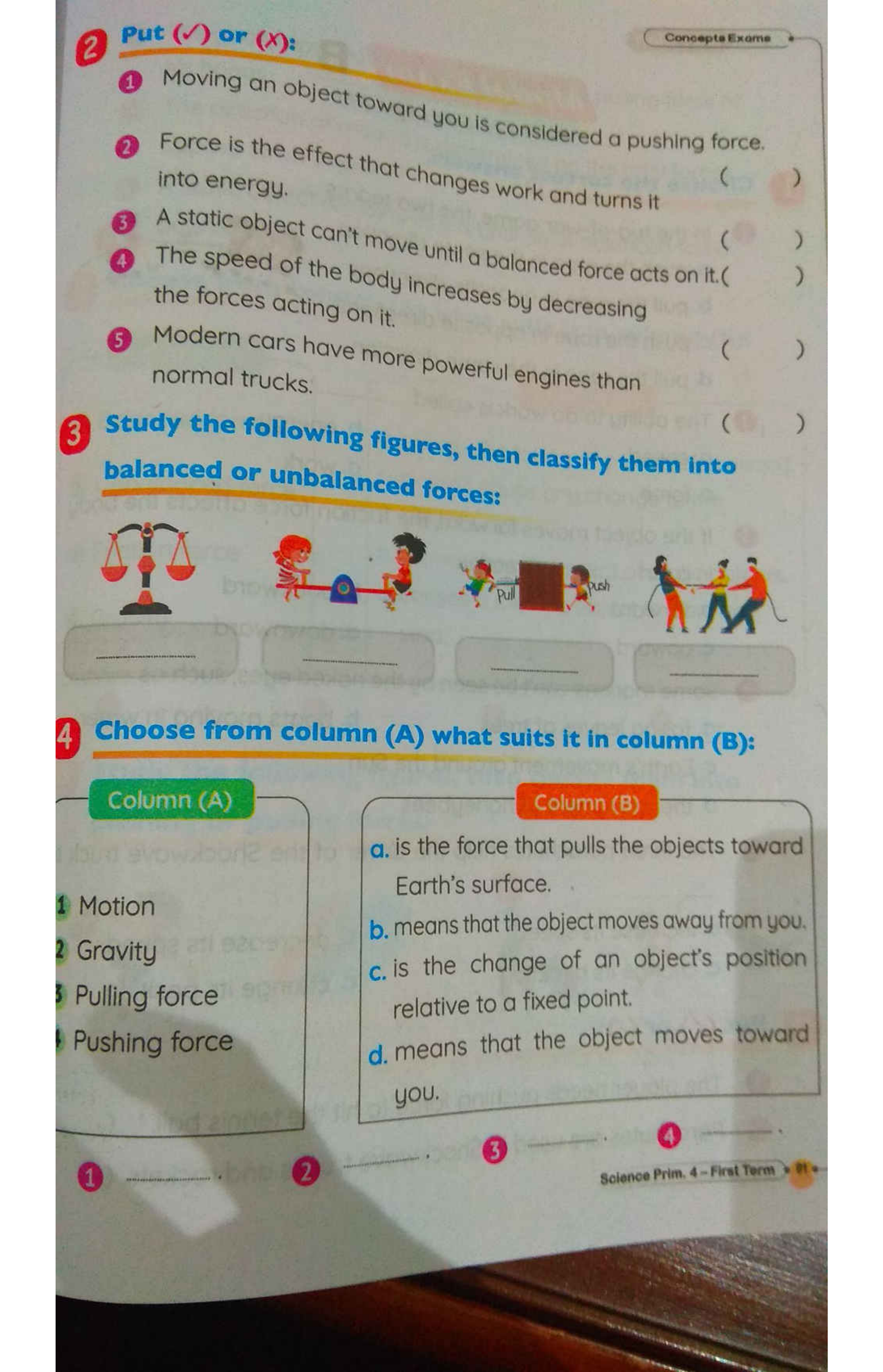
2. The amount of energy required to move an object through ... force acting on it is called ....
   a. speed
   b. kinetic energy
   c. potential energy
   d. work

3. For a static object, all the following equal zero, except ....
   a. force
   b. speed
   c. mass
   d. friction

4. A big truck covers a distance .... a small car if the sa... forces is applied to them.
   a. shorter than
   b. longer than
   c. equal to
   d. similar to

5. In the following figure, the object is under the effect of ....
   a. balanced forces and moving to the right
   b. balanced forces and moving to the left
   c. unbalanced forces and moving to the right
   d. unbalanced forces and moving to the left





2 Put (✓) or (✗):

1. Moving an object toward you is considered a pushing force. ( )
2. Force is the effect that changes work and turns it into energy. ( )
3. A static object can't move until a balanced force acts on it. ( )
4. The speed of the body increases by decreasing the forces acting on it. ( )
5. Modern cars have more powerful engines than normal trucks. ( )

3 Study the following figures, then classify them into balanced or unbalanced forces:

....

4 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Motion	a. is the force that pulls the objects toward Earth's surface.
2 Gravity	b. means that the object moves away from you.
3 Pulling force	c. is the change of an object's position relative to a fixed point.
4 Pushing force	d. means that the object moves toward you.

1 .... 2 .... 3 .... 4 ....

Model Exam B

Unit (2) Concept (1)

1 Choose the correct answer:

1. In the tug-of-war game, the two teams ________.
   a. push the rope in the same direction
   b. pull the rope in opposite directions
   c. push the rope in opposite directions
   d. pull the rope in the same direction

2. The ability to do work is called ________.
   a. speed
   b. energy
   c. force
   d. work

3. If the object moves forward, the friction force affects the bo… in a/an ________ direction.
   a. forward
   b. backward
   c. upward
   d. downward

4. Some motions can't be seen by the naked eyes, such as ________
   a. falling leaves of trees
   b. boats moving in water
   c. Earth's movement around the Sun
   d. the movement of honeybees

5. The three parachutes help the driver of the Shockwave truck ________.
   a. increase its speed
   b. decrease its speed
   c. change its direction
   d. change its position

Put (✓) or (✗):

1. The player needs pushing force to hit the tennis ball. (
2. Parachutes are used in Shockwave trucks and rockets. (

3. The goalkeeper catches the ball using the pulling force of his hands. ( )
4. The direction of motion is determined by the total forces applied to an object. ( )
5. A static object remains as it is until an unbalanced force acts on it. ( )

3 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Balanced force	a. causes the falling of objects downward.
2 Unbalanced force	b. doesn't cause any change to the object's state.
3 Friction force	c. causes the movement of static objects.
4 Gravity	d. causes a moving object to slow and stop.

1 .... 2 .... 3 .... 4 ....

4 Study the following figures, then classify them into pushing or pulling forces:

....

Model Exam A

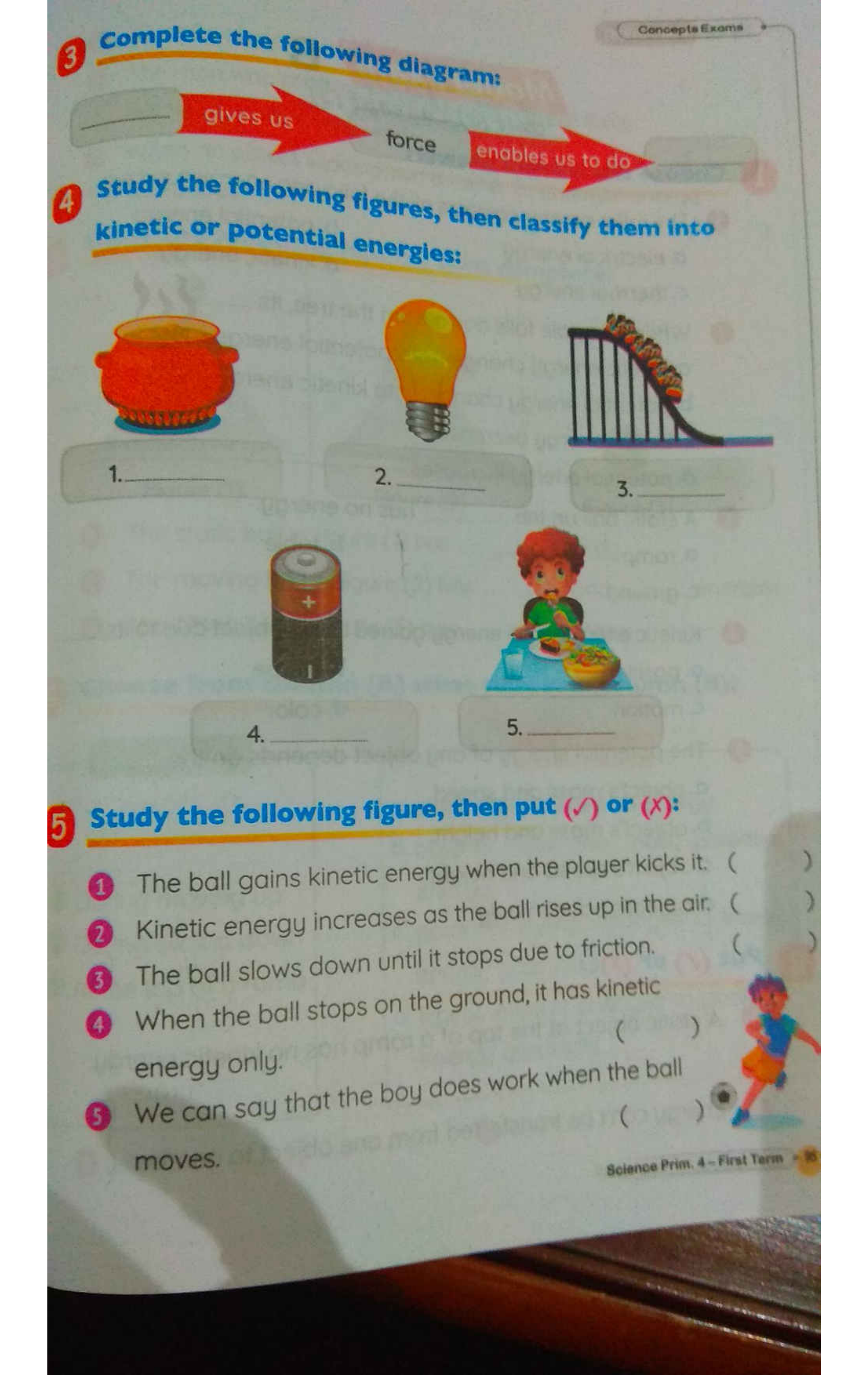
Unit (2) Concept (2)

1 Choose the correct answer:

1. The potential energy of a roller coaster decreases gradu... during ________ .
   a. moving up
   b. sliding down
   c. stopping suddenly
   d. changing its direction
2. All of these objects have energy, except ________ .
   a. a truck moving on a flat road
   b. a static toy car on a ta...
   c. a basketball moving in the air
   d. a static ball on the grou...
3. ________ is the energy that can be seen by the eyes.
   a. Electrical energy
   b. Sound energy
   c. Thermal energy
   d. Light energy
4. When an acrobat player jumps down, his ________ increases
   a. speed
   b. height
   c. mass
   d. potential energy
5. Scientists classify all kinds of energy into ________ energy and ________ energy.
   a. sound - light
   b. thermal - electrical
   c. potential - kinetic
   d. chemical - gravitationa...

Put (✓) or (✗):

1. All forms of energy can be classified into two types. (
2. Force gives us work that enables us to do energy. (
3. The speed of a roller coaster decreases as it moves down the ramp. (
4. A falling object has both kinetic and potential energies. (
5. When you kick a ball, kinetic energy is produced. (



3 Complete the following diagram:

4 Study the following figures, then classify them into kinetic or potential energies:

1. ....
2. ....
3. ....
4. ....
5. ....

5 Study the following figure, then put (✓) or (✗):

1. The ball gains kinetic energy when the player kicks it. ( )
2. Kinetic energy increases as the ball rises up in the air. ( )
3. The ball slows down until it stops due to friction. ( )
4. When the ball stops on the ground, it has kinetic energy only. ( )
5. We can say that the boy does work when the ball moves. ( )

Model Exam B

Unit (2) Concept (2)

1 Choose the correct answer:

1. The roller coaster contains all the following energies, except
   a. electrical energy
   b. potential energy
   c. thermal energy
   d. kinetic energy

2. When an apple falls down from the tree, its ....
   a. kinetic energy changes into potential energy
   b. potential energy changes into kinetic energy
   c. kinetic energy decreases
   d. potential energy increases

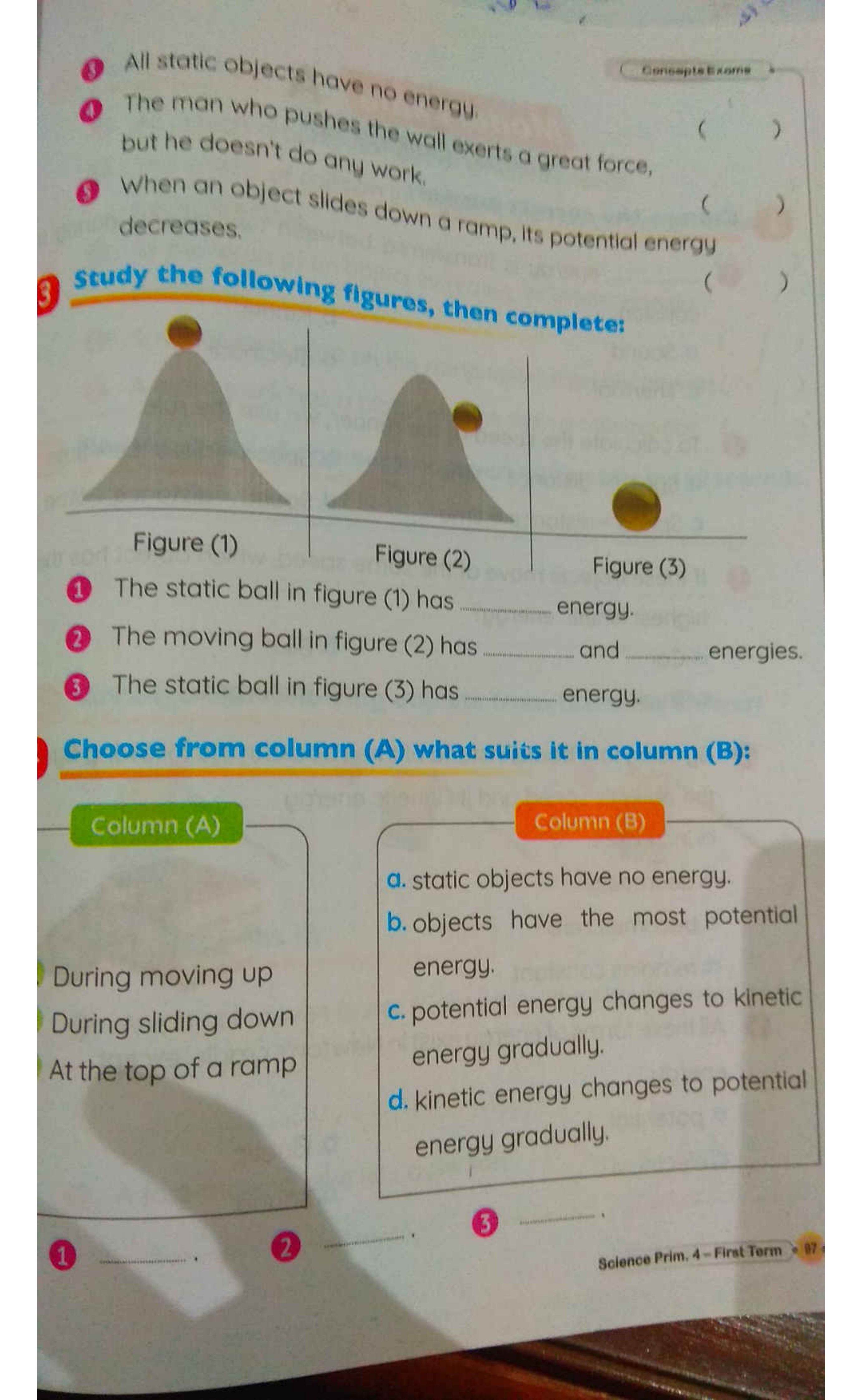
3. A static ball on the .... has no energy.
   a. ramp
   b. table
   c. ground
   d. chair

4. Kinetic energy is the energy gained by an object due to its ....
   a. position
   b. shape
   c. motion
   d. color

5. The potential energy of any object depends on the ....
   a. object's mass and speed
   b. object's mass and height
   c. object's speed and height
   d. object's position only

Put (✓) or (✗):

1. A static object at the top of a ramp has no kinetic energy. (
2. Energy can't be transferred from one object to another. (



3. All static objects have no energy. ( )
4. The man who pushes the wall exerts a great force, but he doesn't do any work. ( )
5. When an object slides down a ramp, its potential energy decreases. ( )

3 Study the following figures, then complete:

1. The static ball in figure (1) has .... energy.
2. The moving ball in figure (2) has .... and .... energies.
3. The static ball in figure (3) has .... energy.

4 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. During moving up	a. static objects have no energy.
2. During sliding down	b. objects have the most potential energy.
3. At the top of a ramp	c. potential energy changes to kinetic energy gradually.
	d. kinetic energy changes to potential energy gradually.

1 .... 2 .... 3 ....

Model Exam A

Unit (2) Concept (3)

1 Choose the correct answer:

1. ______ energy is transferred between two objects du[ring] collision.

   a. Sound b. Kinetic
   c. Thermal d. Electrical

2. To calculate the speed of the runner, we use the rule:

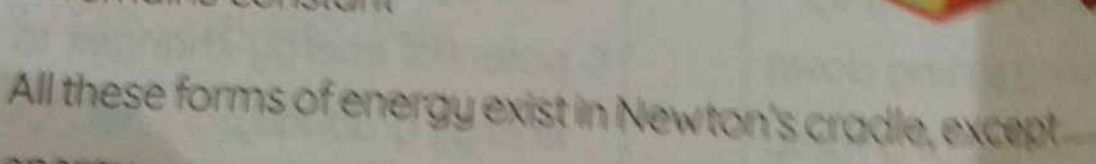
   a. Speed = distance − time b. Speed = distance × tim[e]
   c. Speed = distance + time d. Speed = distance ÷ tim[e]

3. If these objects move at the same speed, which object has th[e] highest kinetic energy?

   a. Car b. Bike
   c. Truck d. Motorbike

4. By using four books instead of three books in the following fig[ure], the object's speed and its kinetic energy ______.

   a. increases
   b. decreases
   c. becomes zero
   d. remains constant



5. All these forms of energy exist in Newton's cradle, except ______ energy.

   a. potential b. kinetic
   c. electrical d. sound

Put (✓) or (✗):

1. All objects around us move at different speeds. ( )
2. The effects of collision increases if the two cars crash in the same direction. ( )
3. As the mass of an object increases, its kinetic energy decreases. ( )
4. Small objects slide on the ramp faster than big objects.( )
5. A static truck has a bigger engine than a moving car. ( )

Find the speed of a runner who covers 600 meters in 150 seconds.

....

....

....

Arrange the following objects from faster to slower:

1 2 3

What happens if:

1. An object moves faster. (Concerning the object's mass and its kinetic energy).

....

2. A fast-moving bike hits a person.

....



Model Exam B

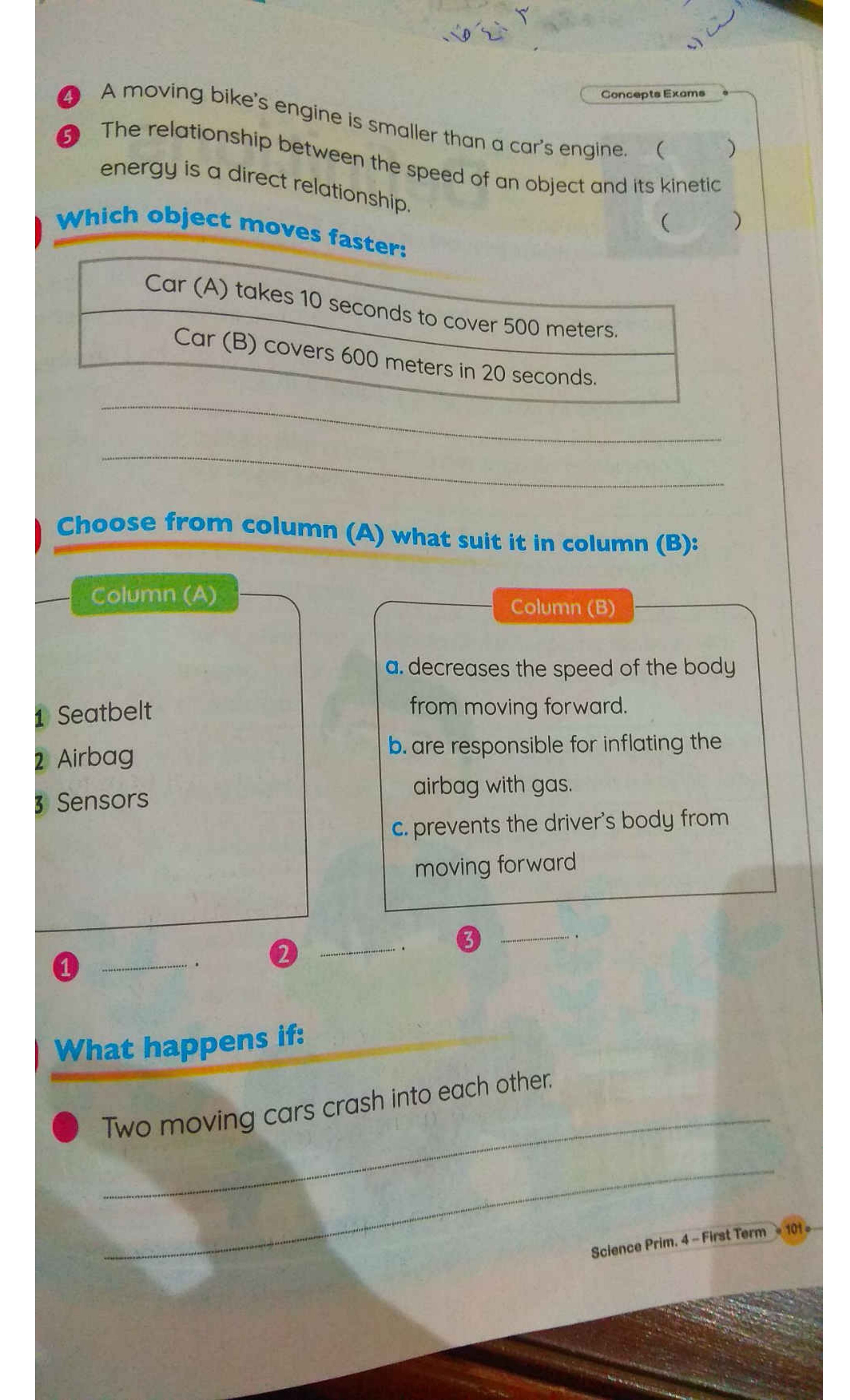
Unit (2) Concept (3)

1 Choose the correct answer:

1. All these kinds of energy exist during collision, except
   a. sound energy
   b. thermal energy
   c. electrical energy
   d. kinetic energy
2. Which of the following measurements doesn't affect an object speed?
   a. Force
   b. Direction
   c. Distance
   d. Time
3. The car with a speed of ______ kilometers per hour consumes less fuel.
   a. zero
   b. 60
   c. 80
   d. 100
4. When a fast bike hits a woman in the street, ______.
   a. she will survive
   b. she may die
   c. her life is in danger
   d. nothing happens to her
5. The moving heavy ball becomes faster on the ______.
   a. flat road
   b. curved road
   c. straight road
   d. inclined ramp

Put (✓) or (✗):

1. The speed of a truck decreases when it takes longer time to cover the same distance. (
2. By increasing the angle of an inclined ramp, the kinetic energy decreases. (
3. A static truck consumes more fuel than a moving car. (



4. A moving bike's engine is smaller than a car's engine. ( )
5. The relationship between the speed of an object and its kinetic energy is a direct relationship. ( )

Which object moves faster:

Car (A) takes 10 seconds to cover 500 meters.
Car (B) covers 600 meters in 20 seconds.

....

....

Choose from column (A) what suit it in column (B):

Column (A)

1. Seatbelt
2. Airbag
3. Sensors

Column (B)

a. decreases the speed of the body from moving forward.
b. are responsible for inflating the airbag with gas.
c. prevents the driver's body from moving forward

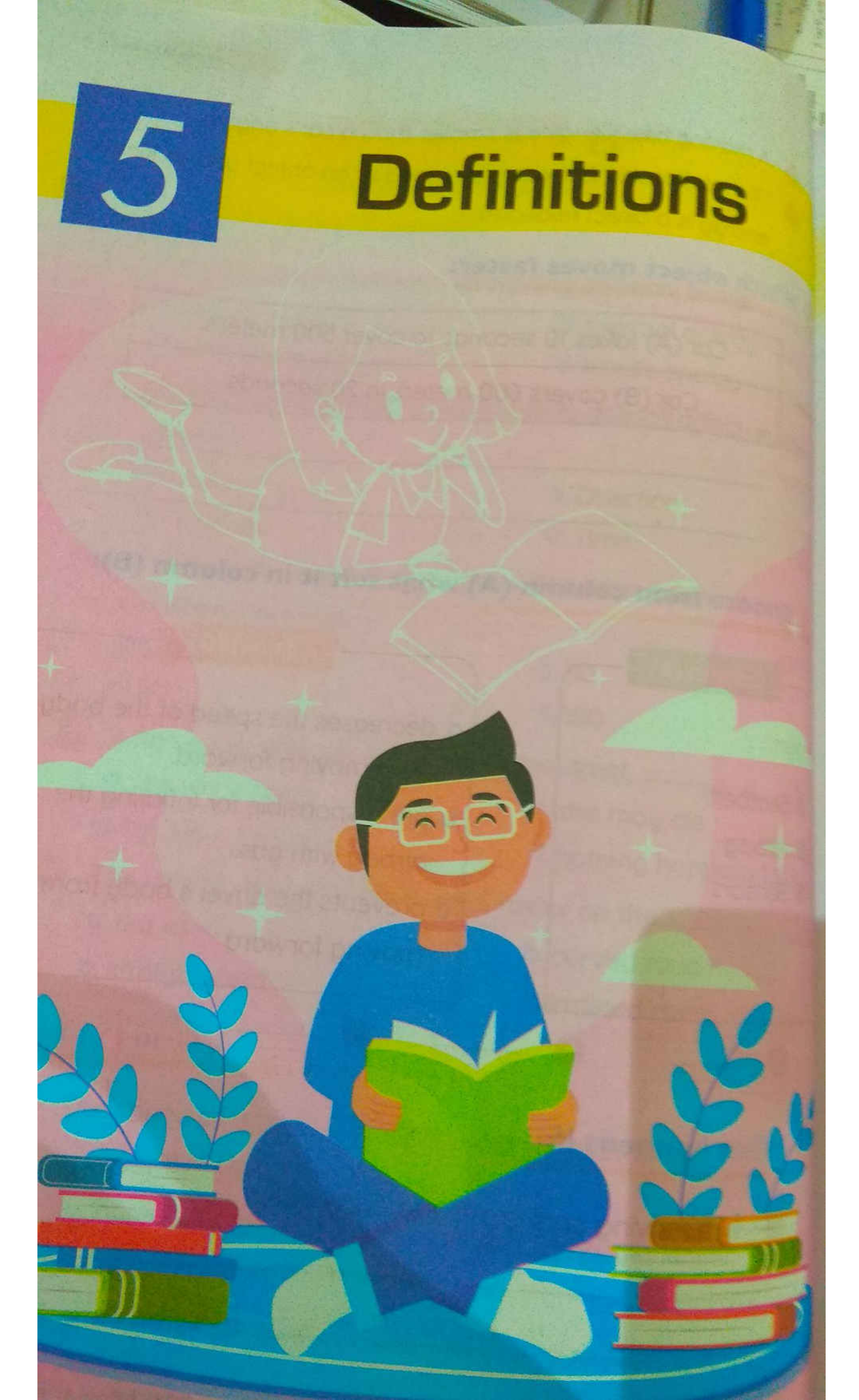
1 .... 2 .... 3 ....

What happens if:

- Two moving cars crash into each other.

....

....

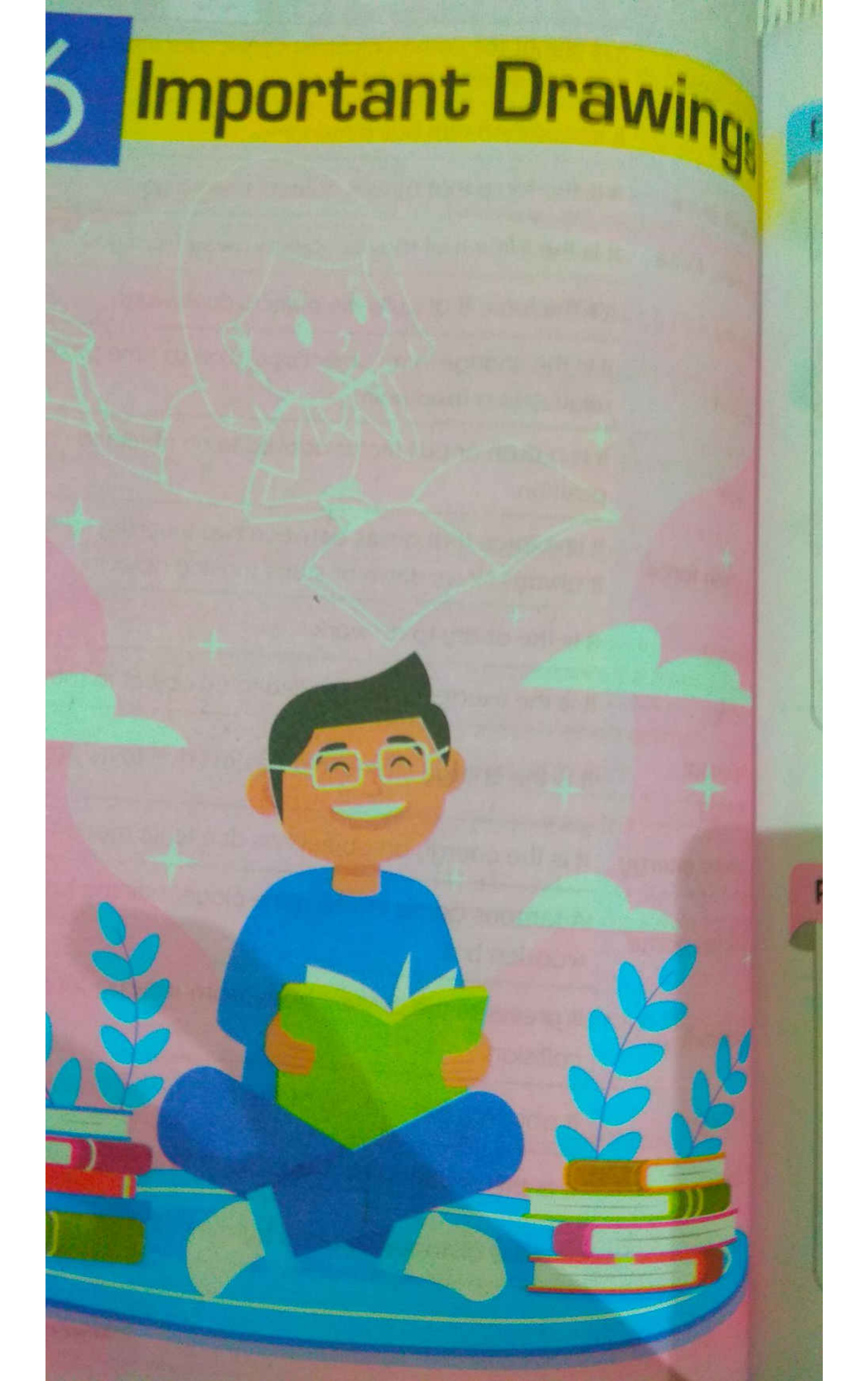

5
Definitions

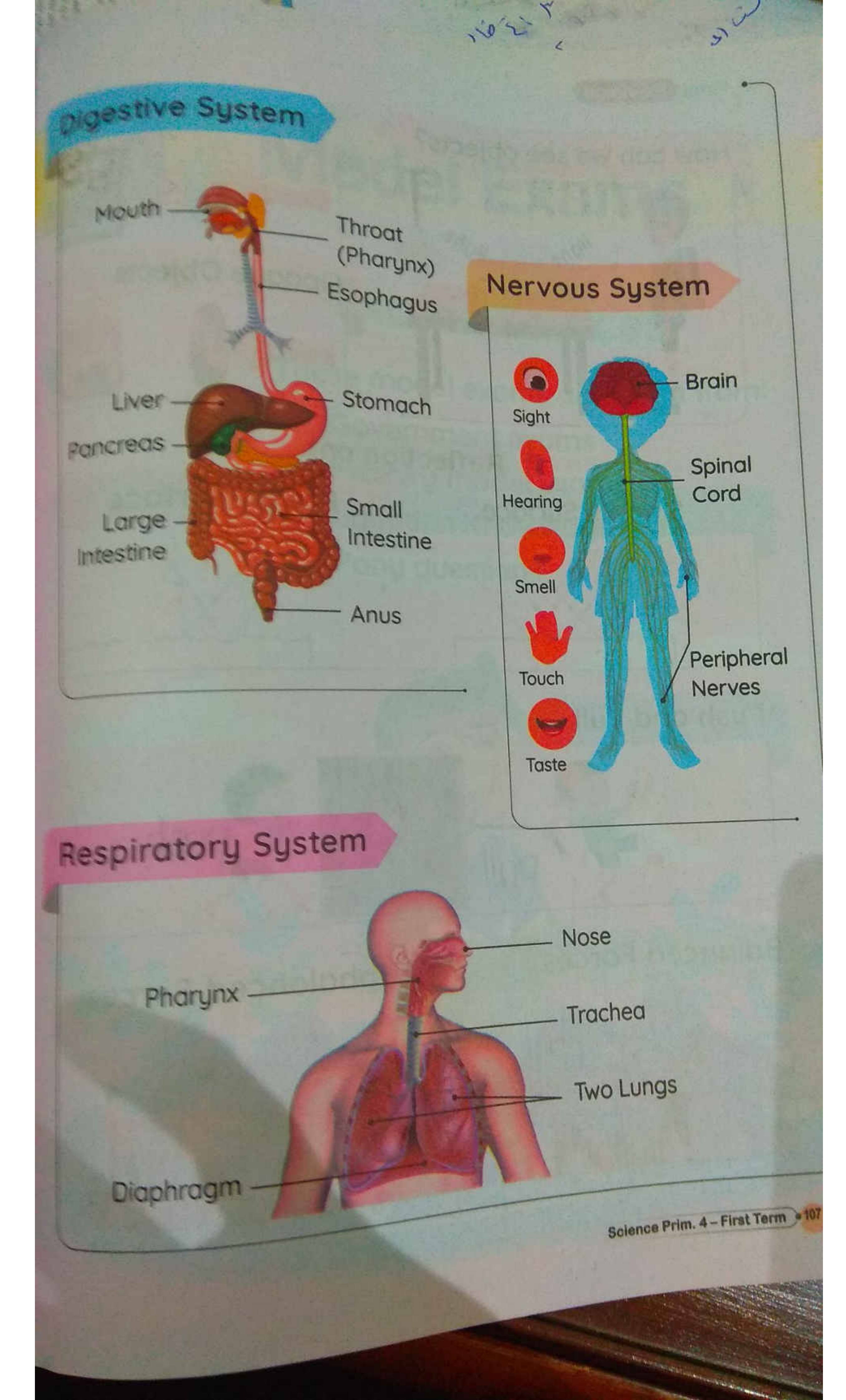
Adaptations	They are the characteristics that help living organisms to survive and reproduce in their ecosystem.
Camouflage	It is an example of adaptation in which some animals hide from predators or prey by blending in with the surrounding environment.
Structural adaptation	A change that happens in the structure of the animals' bodies.
Behavioral adaptation	A change that happens in the behavior of animals.
Digestive system	A system that breaks food into small parts that a body uses to get energy.
Digestion process	A process of breaking down food and changing it to chemical substances that the body absorbs to get the energy and grow.
Respiratory system	The system that is responsible for supplying the body with oxygen gas that our bodies need and getting rid of carbon dioxide gas.
Respiration process	A process by which the air that carries oxygen gas goes into the body and the air carrying carbon dioxide gas gets out of the body.
Inhalation	A process by which the air carrying oxygen gas enters your body.
Exhalation	A process of getting rid of the air carrying carbon dioxide gas out of your body.
Diaphragm	A large muscle that directs inhalation and exhalation processes.
Natural changes	The changes done by nature to the environment. They are slow, so animals can adapt to these changes.
Human activities	The changes done by human activities to the environment. They are fast, so animals cannot adapt to these changes.

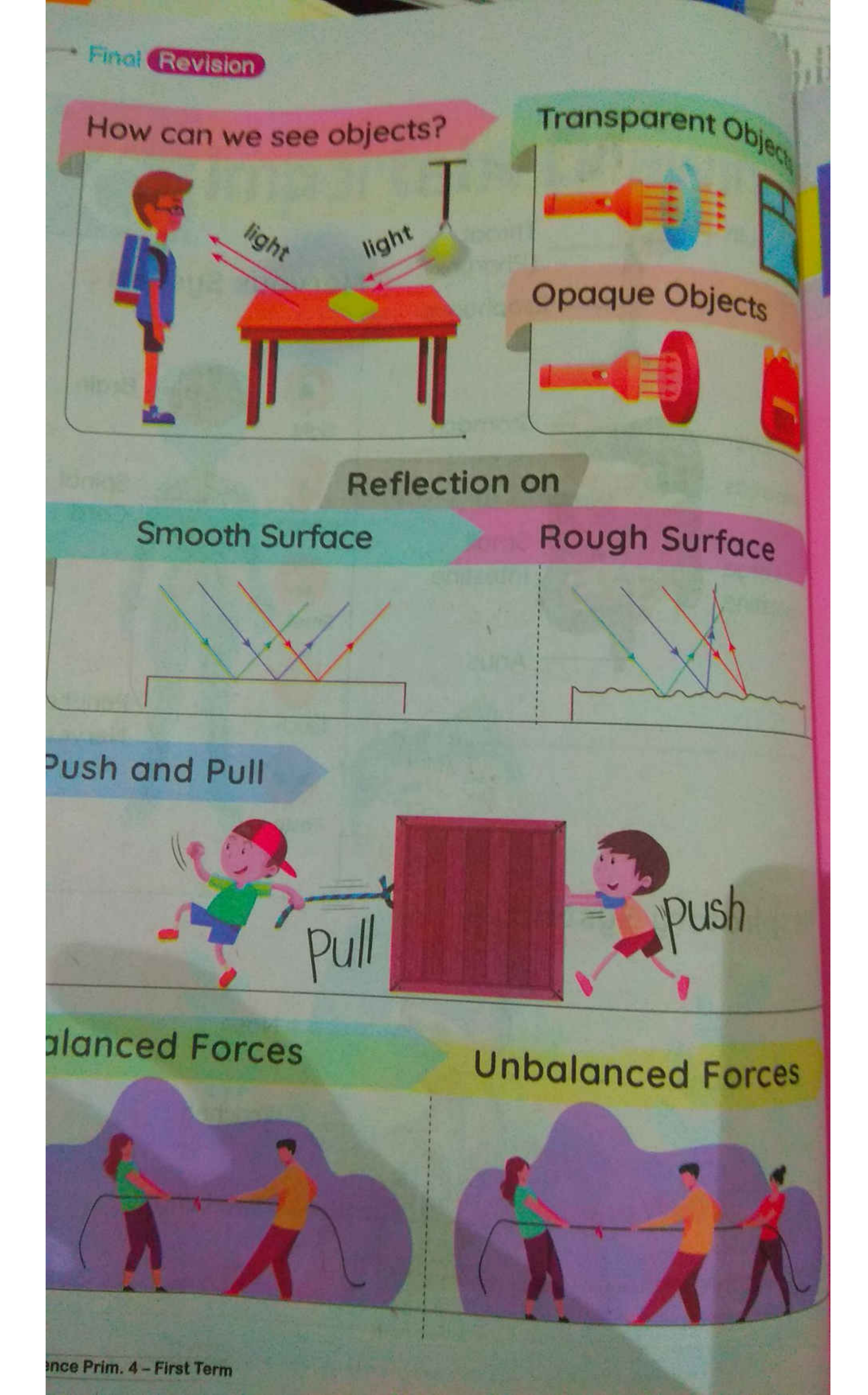
Nocturnal animals	They are animals that adapted to be active at night
Brain	The main control center of the body that translates an processes information.
Spinal cord	It is located inside the backbone and it carries messages from the brain to the body and vice versa.
Nerves	They are branches that are distributed through all body pa
Sensory receptors	They are nerves found in the sensory organs that receive information from the environment.
Reaction time	Time taken by the organism's body to respond to danger and get away from it.
Reflex	A type of message that is transmitted very fast.
Source of light	Something that emits its own light.
Light	It is a visible form of energy that travels in the form of wa
Tapetum lucidum	It is a thin reflective layer at the back of an animal's eyes that reflects light to collect all available light.
Light reflection	It is the bouncing of light rays when they fall on a reflectin surface.
Shiny materials	They are materials that reflect most light rays that fall on them.
Rough naterials	They are materials that reflect some light rays that fall o them.
ransparent naterials	They are materials that allow light to pass through.
paque aterials	They are materials that don't allow light to pass through

Morse code	It is one of the communication systems for long distances that was developed by Morse.
Code	It is a pattern that has a meaning.
Pulling force	It is the force that moves objects toward you.
Pushing force	It is the force that moves objects away from you.
Gravity	It's the force that pulls the objects downward.
Motion	It is the change in an object's position as time passes relative to a fixed point.
Force	It is a push or pull that is applied to an object to change its position.
Friction force	It is a force that arises between two touching surfaces and it always slows down or stops moving objects.
Energy	It is the ability to do work.
Work	It is the exerted force applied to on object to move it.
Potential energy	It is the energy stored in an object due to its position.
Kinetic energy	It is the energy an object has due to its motion.
Cricket game	A famous game in which the player hits the ball with a wooden bat.
Seatbelt	It prevents the driver's body from moving forward during collision.
Airbag	It absorbs the energy of the car during collision.
Collision	It is the crashing of two objects together.
Speed	It is the distance covered by a moving object in a unit of ti

6 Important Drawings




Digestive System
Mouth
Throat
(Pharynx)
Esophagus
Liver
Stomach
Pancreas
Small
Intestine
Large
Intestine
Anus
Nervous System
Brain
Sight
Hearing
Spinal
Cord
Smell
Touch
Peripheral
Nerves
Taste
Respiratory System
Nose
Pharynx
Trachea
Two Lungs
Diaphragm


How can we see objects?
light
light
Transparent Objects
Opaque Objects
Reflection on
Smooth Surface
Rough Surface
Push and Pull
Pull
push
alanced Forces
Unbalanced Forces



Model Exams

Exams Sources:

These model exams are taken from:

1. Government exams
2. Ministry model exams
3. Egyptian Knowledge Bank
4. Pony questions

Model Exam 1

1 Choose the correct answer:

1. In order for the human being to remain alive, there must an integration between the senses and the .... system interact with the surrounding environment.
   a. digestive
   b. respiratory
   c. nervous
   d. circulatory

2. .... pant to lower their body temperature.
   a. Whales
   b. Bats
   c. Lions
   d. Foxes

3. When the driver stops suddenly, all the passengers will move ....
   a. upward
   b. forward
   c. backward
   d. downward

4. Each of the following is considered a source of light, except ....
   a. the fire
   b. the sun
   c. the lamp
   d. the moon

5. Raising the thumb up and lowering it down are kinds of ....
   a. colors
   b. codes
   c. waves
   d. lights

Put (✓) or (✗):

1. The respiratory system is responsible for the entry of air rich in oxygen gas into the body. (   )
2. Foxes have a strong sense of hearing. (   )
3. The moon is a source of light. (   )

4. Red and green traffic lights are codes. ( )
5. The driver should drive as fast as possible to avoid accidents. ( )

3 **Calculate the speed of a train that covers 600 km in a time of 6 hours.**

....

....

....

4 **Which of the following surfaces represents the reflection of light rays from a wooden spoon and why?**

(A) (B)

....

....

....

Model Exam 2

Choose the correct answer:

1. .... energy affects the sensory receptors in the eye causing vision.
   a. Sound
   b. Kinetic
   c. Light
   d. Magnetic
2. The eye sends messages to the .... through the nerves
   a. spinal cord
   b. heart
   c. lungs
   d. brain
3. .... cover(s) body of an Arctic fox.
   a. Thick fur
   b. Heavy hair
   c. Heavy skin
   d. Many feathers
4. Animals can communicate with each other by ....
   a. talking
   b. sound
   c. writing
   d. reading
5. Moving a box away from you represents .... force.
   a. magnetic
   b. gravitational
   c. pulling
   d. pushing

Put (✓) or (✗):

1. The feet of a penguin do not freeze because they have a layer of fat. ( )
2. Bats use their sense of hearing to avoid danger. ( )
3. Wood is a transparent object that allows light to pass through. ( )
4. Bees can know the sweet taste by their sense of smell. ( )
5. The airbag deflates at the same speed as it is inflated. ( )

3 **If the two cars moved at the same time for 20 seconds, car (A) covered a distance of 200 meters, while car (B) covered a distance of 300 meters. Which of the two cars has a higher speed?**

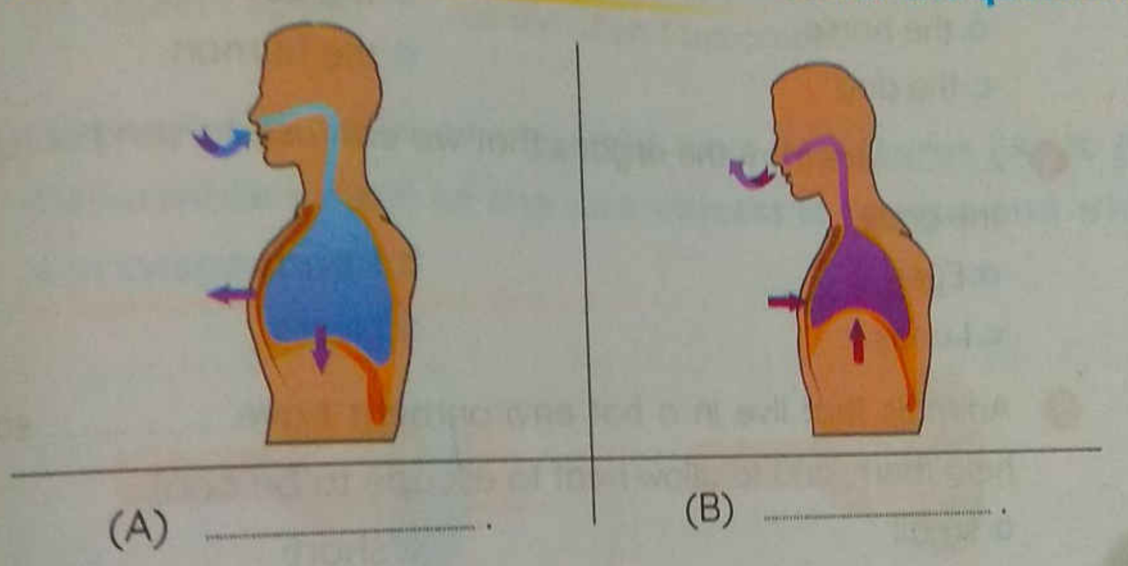
....

....

....

....

4 **Label the following two processes, then answer the questions:**



(A) .... (B) ....

1. What happens to the diaphragm in figure (A)?

....

2. What happens to the chest size in figure (B)?

....

Model Exam 3

1 Choose the correct answer:

1. The skin is an important organ of the ______ system.
   a. digestive
   b. nervous
   c. respiratory
   d. circulatory

2. The pushing and pulling forces are different in ______.
   a. mass
   b. color
   c. direction
   d. energy

3. There is a tapetum lucidum in all of the following, except ______
   a. the horse
   b. the cat
   c. the dog
   d. the human

4. ______ are from the organs that we can use to send or rece the code.
   a. Eyes
   b. Hearts
   c. Lungs
   d. Livers

5. Animals that live in a hot environment have ______ ears help them, and to allow heat to escape to be cool.
   a. small
   b. short
   c. long
   d. sharp

Put (✓) or (✗):

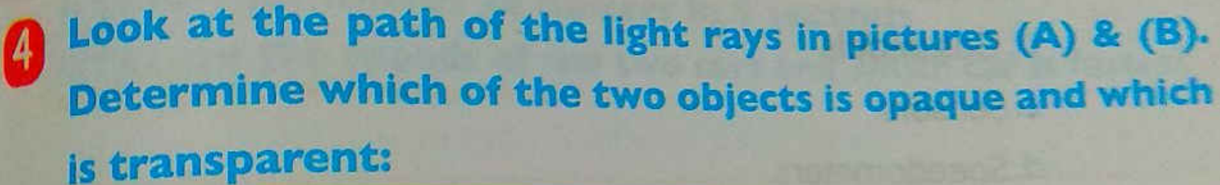
1. During running and making an effort, the number of breathin times decreases. (
2. Dolphins have a strong sense of hearing. (
3. Humans have a tapetum lucidum in their eyes to help them see at night. (

4. Speed is the distance covered by an object multiplied by the time taken. ( )

5. The seatbelt is used to decrease the speed of the driver when he/she moves forward. ( )

3 Study the following figure, then choose the correct word:

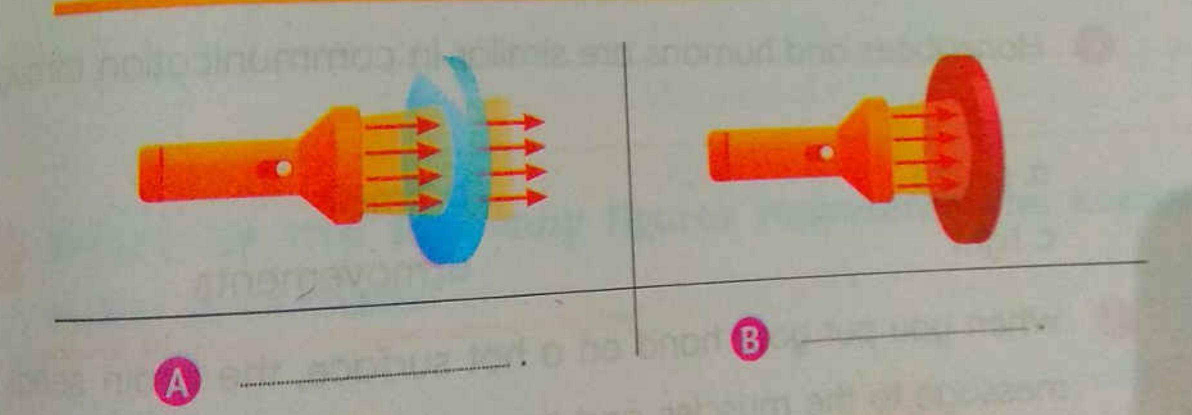
(faster – slower – increases – decreases – remains constant)



a. By using a smaller ball on the same ramp, the object's speed .... as the object becomes ....

b. By increasing the number of books, the object's speed .... as the object becomes ....

4 Look at the path of the light rays in pictures (A) & (B). Determine which of the two objects is opaque and which is transparent:



A ....

B ....

Model Exam 4

1 Choose the correct answer:

1. Fish extract oxygen out of the water using their ______.

   a. skin b. gills
   c. lungs d. fins

2. Which of the following allows light to pass through it?

   a. A rock b. The moon
   c. Wood d. Glass

3. ______ make the airbag inflate and fill with gas to prov a soft cushion.

   a. Brakes
   b. Gas pedals
   c. Sensors
   d. Speedometers

4. Honeybees and humans are similar in communication throu ______.

   a. sound b. smell
   c. light d. movements

5. When you put your hand on a hot surface, the brain sends message to the muscles and the action that comes from y immediately after it is to ______.

   a. keep placing your hand
   b. feel pain
   c. pull your hand away from the hot object
   d. do nothing

Put (✓) or (✗):

1. The migration of birds to search for food is considered a form of structural adaptation. (   )
2. Nocturnal animals have eyes that are larger than the humans' eyes. (   )
3. If I can see my face clearly on a surface, this means that it is a smooth, shiny surface. (   )
4. A static object has no kinetic energy until unbalanced forces act on it. (   )
5. The apple on the ground has no energy. (   )

A yellow car moves 10 meters in 5 seconds
A green car moves 20 meters in 5 seconds
What are the speeds of the two cars and which car is faster?

....

....

....

4 Which of the following figures represents the correct vision in humans?

Figure (1)

Figure (2)

Model Exam 5

1 Choose the correct answer:

1. The echo sound feature depends on the ________.
   - a. sight sense
   - b. hearing sense
   - c. taste sense
   - d. touch sense

2. A static ball on the ________ has no energy.
   - a. ramp
   - b. table
   - c. ground
   - d. chair

3. A surface that reflects light rays in the same direction is ________
   - a. smooth and shiny
   - b. dark with impurities
   - c. transparent and clean
   - d. rough and dark

4. Humpback whales use singing for ________.
   - a. heating
   - b. hiding from enemies
   - c. communication
   - d. having fun

5. Adaptation includes changes that ________ in the environme
   - a. reduce chances of survival
   - b. improve species survival
   - c. reduce life span for individuals
   - d. reduce reproduction process

Put (✓) or (X):

1. Plants have two types of adaptation, structural and behavio (

2. Animals can use more than one sense to communicate with each other. (

3. All nocturnal animals need a source of light to see. (

4. A static object at the top of a ramp has no kinetic energy. ( )
5. Force affects an object and changes work into energy. ( )

3 From the following figure, calculate the speed of the solar vehicle:

00:20

1200 meters

Time: 20 seconds

....

....

....

4 Classify the following words in the table:

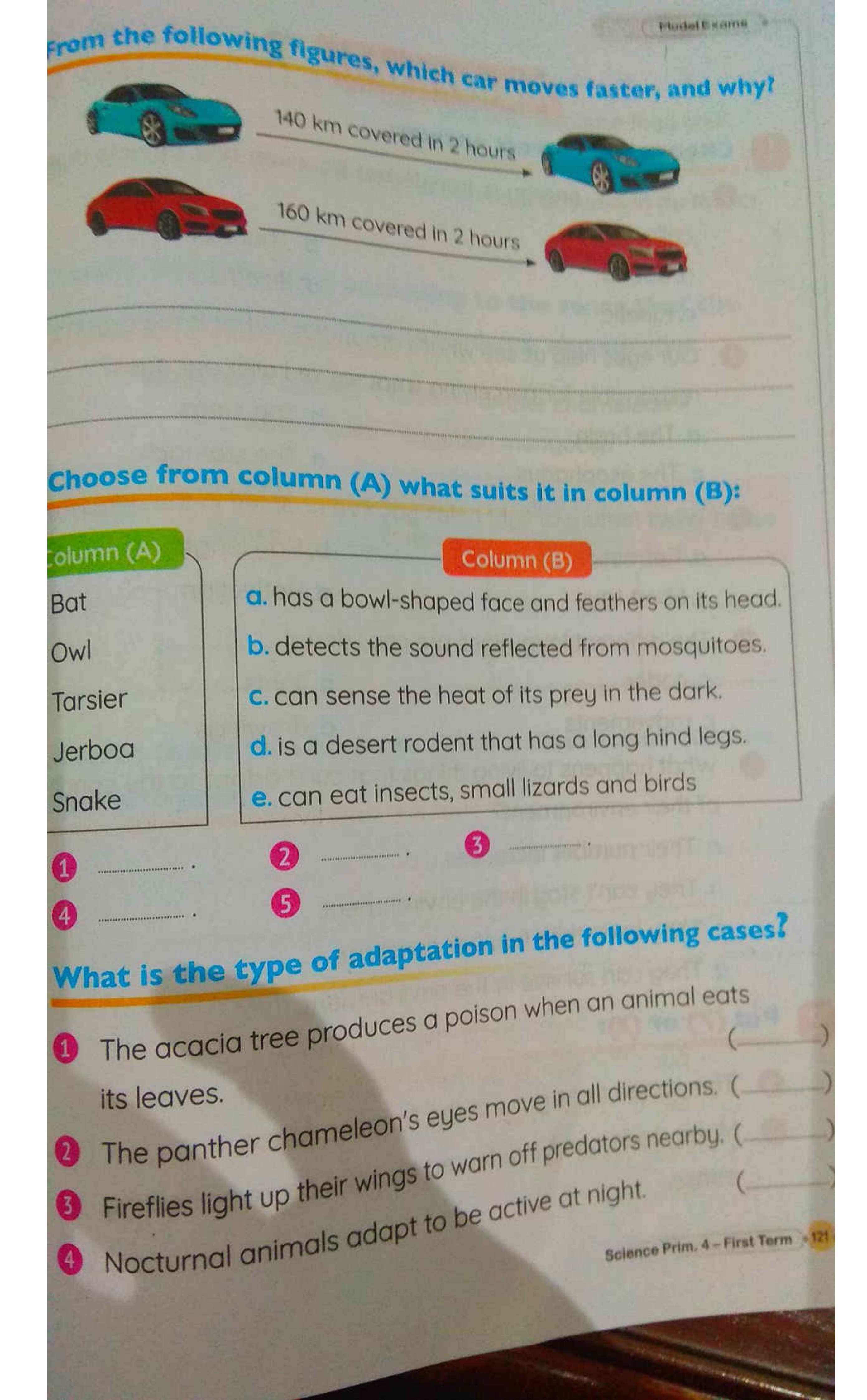
Lungs – Tongue – Nose – Anus – Brain – Alveoli – Liver – Nerves – Stomach – Spinal cord – Small intestine

Digestive System	Respiratory System	Nervous System
....	....	....
....	....	....
....	....	....
....	....	....

Model Exam 6

1 Choose the correct answer:

1. The dolphin can locate its prey through its sense of ______
   a. smell
   b. hearing
   c. sight
   d. taste
2. Which of the following is a source of light?
   a. The eye
   b. The moon
   c. Fire
   d. A mirror
3. Animals can communicate with each other through ______
   a. sounds and lights
   b. talking
   c. reading
   d. writing
4. The stomach is a part of the digestive system that ______
   a. chews food
   b. converts solid food into liquid
   c. absorbs nutrients from food
   d. delivers food into the esophagus
5. In the tug-of-war game, the two teams ______.
   a. push the rope in the same direction
   b. pull the rope in opposite directions
   c. push the rope in opposite directions
   d. pull the rope in the same direction



From the following figures, which car moves faster, and why?

140 km covered in 2 hours

160 km covered in 2 hours

....

....

....

Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
Bat	a. has a bowl-shaped face and feathers on its head.
Owl	b. detects the sound reflected from mosquitoes.
Tarsier	c. can sense the heat of its prey in the dark.
Jerboa	d. is a desert rodent that has a long hind legs.
Snake	e. can eat insects, small lizards and birds

1 .... 2 .... 3 ....

4 .... 5 ....

What is the type of adaptation in the following cases?

1. The acacia tree produces a poison when an animal eats its leaves. (..........)
2. The panther chameleon's eyes move in all directions. (..........)
3. Fireflies light up their wings to warn off predators nearby. (..........)
4. Nocturnal animals adapt to be active at night. (..........)

Model Exam 7

1 Choose the correct answer:

1. ________ energy is transferred between two objects during collision.
   a. Sound b. Thermal
   c. Kinetic d. Electrical
2. Our eyes help us see what's around us. What is the organ that responsible for perceiving what we see with our eyes?
   a. The brain b. The lungs
   c. The esophagus d. The stomach
3. What feature of light helps you see yourself in the mirror?
   a. Refraction b. Ray length
   c. Short rays d. Reflection
4. The different languages are considered ________ .
   a. codes b. lights
   c. movements d. drawings
5. What happens to living things that can't adapt to the conditions of their environment?
   a. Their number increases.
   b. They can't stay in the environment.
   c. They keep their number constant.
   d. They can survive in the environment.

Put (✓) or (✗):

1. The acacia trees grow in the Amazon forest. ( )
2. Morse code can be detected by sight sense or hearing sense. ( )

3. Some animals can see at night, such as a wild cat. (   )
4. Codes are very useful for bees and ants because they can't talk like humans. (   )
5. Distance covered by an object can be measured in meters or kilograms. (   )

3 Classify the following according to the sense that the living organism uses to communicate and survive:

Dolphins – Snakes – Bees – Panther chameleon – Ants – Bats – Egyptian mongoose

Movement	Hearing Sense	Smell Sense	Touch Sense	Taste Sense
....	....	....	....	....
....	....	....	....	....

4 A train takes five hours to cover a distance of 200 km. Find its speed.

....

....

....

Model Exam 8

1 Choose the correct answer:

1. Humpback whales communicate with each other through the sense of ....
   a. sight b. hearing
   c. smell d. touch

2. An object's mass affects its ....
   a. potential energy only
   b. kinetic energy only
   c. both kinetic and potential energies
   d. neither kinetic nor potential energies

3. The roots of the palm plants help them to ....
   a. stand strong against the wind
   b. reach the underground soil
   c. fix the plants in the soil
   d. all the previous

4. The .... is an animal that can escape from enemies because of the length of its hind legs.
   a. Arctic fox b. jerboa
   c. penguin d. panther chameleon

Adel wanted to make a suitable box through which he could see what was inside without having to open it. What material should be used?
   a. Wood b. A mirror
   c. Carton d. Glass

2 Put (✓) or (✗):

1. Man cannot restore the ecosystem in any way. ( )
2. Food turns from complex to simple during digestion. ( )
3. The brain translates the code after receiving it. ( )
4. The object that takes the longest time on the ramp has the biggest mass. ( )
5. Moving an object toward you is considered a pushing force. ( )

3 Classify the following words in the table:

Mirror – Wood – Glass – Metal – Plastic

Shiny Surfaces	Rough Surfaces	Transparent Surfaces
....	....	....
....	....	....
....	....	....

4 Choose from column (A) what suits it in both columns (B) & (C):

Column (A)	Column (B)	Column (C)
Living Organisms	Way of Communication	Depend on
1 Humans	a. use echolocation.	a. light energy only.
2 Fireflies	b. use Morse code.	b. sound energy only.
3 Bats	c. flash their wings.	c. sound and light energies

1 .... 2 .... 3 ....

Model Exam 9

Choose the correct answer:

1. The rope in the tug-of-war game moves when the forces acting on it are ______ .
   - a. equal
   - b. balanced
   - c. unbalanced
   - d. equal zero
2. Which of these is an example of camouflage?
   - a. Camel's broad feet
   - b. Camel's hump
   - c. Powerful parrot wings
   - d. The fox is golden like its environment.
3. Traffic lights depend on the sense of sight in communication as ______ .
   - a. fireflies
   - b. dolphins
   - c. ants
   - d. bats
4. When light is reflected off a surface in different directions, this surface is ______ .
   - a. transparent
   - b. smooth
   - c. rough
   - d. opaque
5. Sameh drives his bike, and while he hears a car behind him, he turns away so as not to hit it. The system that received a signal making Sameh realize that is ______ .
   - a. the nervous system
   - b. the respiratory system
   - c. the digestive system
   - d. the circulatory system

ut (✓) or (✗):

1. The fur that some animals possess to protect them from the cold is a behavioral adaptation. ( )

2. The brain is responsible for processing information. ( )
3. The goalkeeper catches the ball by the pushing force of his hands. ( )
4. Humpback whales change their sound pitch according to the seasons. ( )
5. The object that covers the same distance in a longer time, its speed increases. ( )

3 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Light	a. depends on the body's sense of heat for predation.
2. An owl	b. depends on the echo of the sound in locating the prey.
3. A snake	c. is an animal with a bowl-shaped face.
4. A bat	d. it is the visible form of energy that is transmitted in the form of waves.
5. Mirror-like membrane	e. a structural adaptation in the eye that provides some animals with better vision at night
	f. a sense that helps us hear birds.

1. ______ . 2. ______ . 3. ______ .
4. ______ . 5. ______ .

4 Study the following figure, then answer the questions:

1. What does the following figure represent? ______
2. Does this system exist in humans only? ______
3. Label the following:
   1. ______
   2. ______
   3. ______

Model Exam 10

1 Choose the correct answer:

1. One of the adaptations that help an animal protect itself from enemies is ....
   a. blending in   b. extinction
   c. immigration   d. reproduction
2. .... is from the opaque objects.
   a. Glass   b. Carton
   c. Plastic   d. Air
3. The .... system helps us to translate messages that come from our surroundings, such as smells and sounds.
   a. respiratory   b. digestive
   c. circulatory   d. nervous
4. Sending smelly messages when there is a shortage of food is the function of ....
   a. queen ants   b. nurse ants
   c. scout ants   d. solider ants
5. To calculate the speed of the runner, we use the rule: ....
   a. Speed = distance − time   b. Speed = distance × time
   c. Speed = distance ÷ time   d. Speed = distance + time

Put (✓) or (✗):

1. Some animals that live in the cold have long ears to help them to maintain their body temperature. (   )
2. The nervous system works separately from the five senses. (   )

3. Gravitational force is an upwards pulling force. ( )
4. The sun is a natural source of light. ( )
5. When you kick a ball, kinetic energy is produced. ( )

Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. The spinal cord	a. it is similar in its processing of information to a computer.
2. Using the sense of sight	b. when a foreign object is brought into your eyes.
3. The brain	c. when an object falls from your hands.
4. The reflex occurs	d. the transmission of commands to the muscles to contract.

1. .... 2. .... 3. .... 4. ....

Omar rode his bike 15 kilometers in 3 hours, how fast was he going? Rashida rode her bike 30 kilometers in 2 hours, how fast was she going? Which rider is the fastest? And why?

....

....

....

Model Exam 11

Choose the correct answer:

1. Cats' eyes are adapted to night vision due to the presence of the .... behind their eyes.
   a. wide eyes
   b. eye pupil
   c. tapetum lucidum
   d. eye lens

2. Kinetic energy is the energy gained by an object due to its ....
   a. position
   b. shape
   c. motion
   d. size

3. What carries the message from your eyes to your brain when you see something?
   a. Nerves
   b. Muscles
   c. Veins
   d. Glands

4. A blind person's cane and .... emit high-pitched sounds that bounce off form echo.
   a. lizards
   b. bats
   c. bull sharks
   d. polar bears

5. What is adaptation?
   a. The process by which new species appear.
   b. A form of pollination for trees.
   c. A feature owned by living things to help them survive.
   d. A process of getting rid of harmful substances in living things

Put (✓) or (X):

1. Animals digging trenches is a form of structural adaptation. ( )
2. Reflex is the time taken for the body to receive information from the environment. ( )
3. All objects around us move at different speeds. ( )
4. Long beeps in Morse code are represented by dots. ( )
5. Food stays in the stomach for a few minutes. ( )

Complete using the following words:

(Penguins - Owls - Bats - Bull Sharks - Fennec foxes - Polar foxes - Panther chameleons)

1. .... pant to lower their bodies temperature.
2. .... are from the nocturnal animals that have poor night vision.
3. .... have the ability to rotate their heads in all directions, and it is called super sensory adaptation.
4. .... can sneak up on its prey using countershading.

Arrange the following steps that represent the vision process:

(............) Brain translates these signals.

(............) Eye pupils allow the light to enter the eyes.

(............) Light falls on objects.

(............) Sensory receptors at the back of the eyes send signals to the brain.

(............) Light reflects on the eyes.

Model Exam 12

Choose the correct answer:

1. .... is the force that attracts objects toward Earth's surface.
   a. Magnetic energy   b. Electrical energy
   c. Friction force   d. Gravity
2. The light-reflecting materials include ....
   a. wood   b. mirrors
   c. plastic   d. paper
3. To communicate through the sense of sight, we need ....
   a. to make sound   b. light
   c. to hear music   d. to touch something
4. The eagle is a bird that eats the meat of its prey. Its beak is strong and sharp. This structural adaptation helps it to ....
   a. see   b. find a shelter
   c. rip meat   d. escape
5. Songs of humpback whales in winter are characterized by ....
   a. high-pitched sounds
   b. low-pitched sounds
   c. rough sounds
   d. weak sounds

...ut (✓) or (✗):

Bats use light as a means of communication with each other. ( )

The spinal cord is an important organ of the digestive system. ( )

Fish have gills to expel oxygen underwater. ( )

4. When a moving bike hits a man, he may be injured only and survive. ( )

5. Digestion of food begins in the mouth. ( )

Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Carbon dioxide	a. is a common organ in the digestive and respiratory systems.
2. Diaphragm	b. is a gas necessary for respiration.
3. Throat (pharynx)	c. is a muscle that has an important role in the breathing process.
4. Oxygen	d. is a gas produced by respiration.

1. .... 2. .... 3. .... 4. ....

Study the following table, then complete:

	Car (A)	Car (B)	Car (C)
Distance (Meters)	200	200	100
Time (Seconds)	4	2	2

....

....

....

a. Car (........) is the fastest one.

b. Cars (........) and (........) move with the same speed.

Model Exam 13

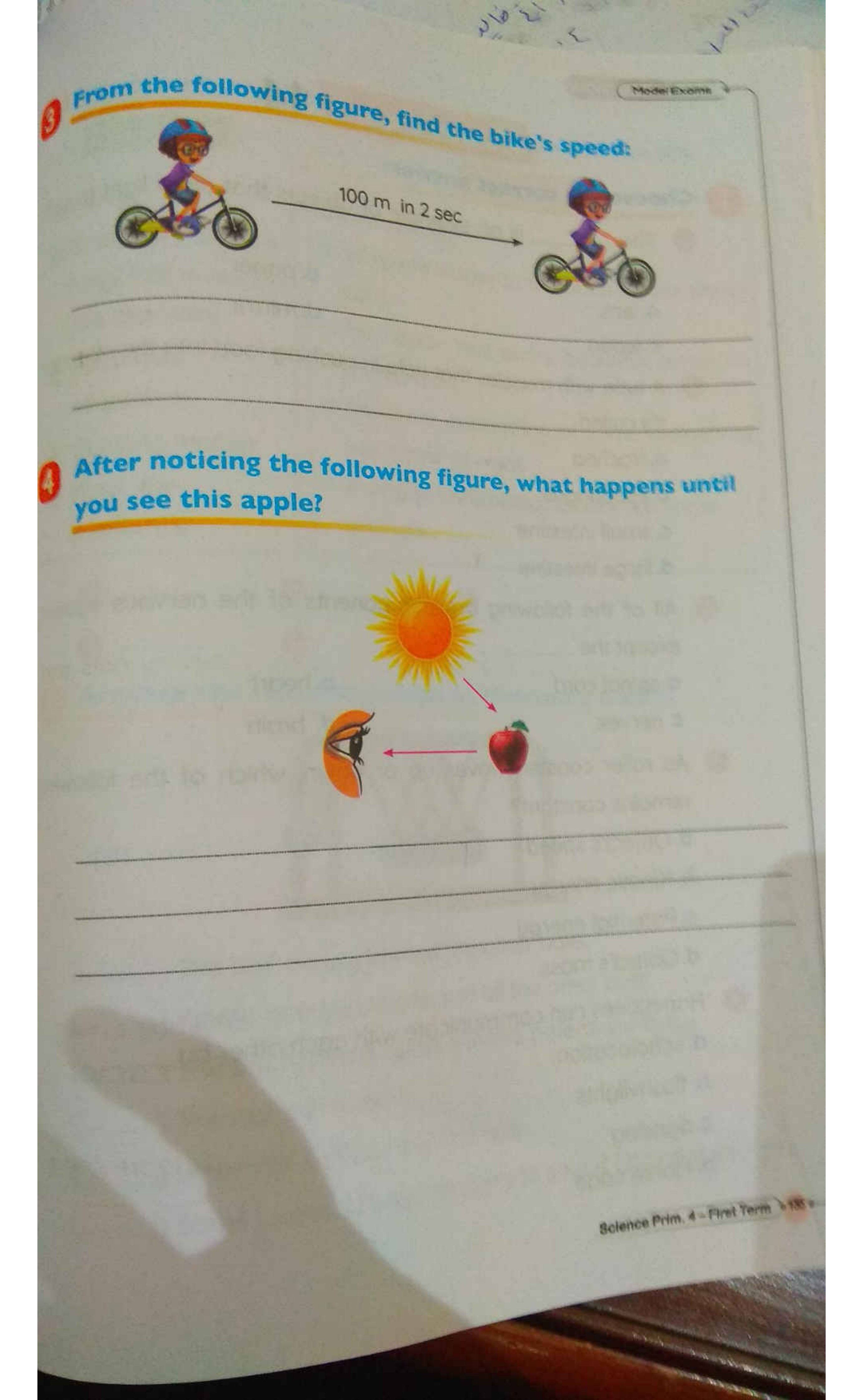
Choose the correct answer:

1. .... mix(es) and grind(s) food inside the mouth.
   a. Teeth only b. Tongue only
   c. Saliva only d. Teeth and tongue
2. As the angle of the inclined ramp decreases, the object's speed ....
   a. increases b. decreases
   c. remains constant d. becomes zero
3. When light falls on a dark surface, ...
   a. the surface absorbs the light b. light passes through it
   c. the light is refracted d. nothing happens
4. The bat is considered a .... animal.
   a. nocturnal b. morning
   c. harmful d. non-flying
5. Morse code consists of .... beeps known as dots and .... beeps known as dashes.
   a. short - short b. long - long
   c. short - long d. long - short

Choose from column (A) what suits it in column (B):

olumn (A)	Column (B)
ght	a. it does not absorb food.
amouflage	b. a type of adaptation that helps animals to hide.
ophagus	c. ants use it to sense and communicate smells.
aphragm	d. it helps us see.
nell	e. a muscle that plays an important role in breathing.

.... 2 .... 3 .... 4 .... 5 ....



3 From the following figure, find the bike's speed:

4 After noticing the following figure, what happens until you see this apple?

Model Exam 14

Choose the correct answer:

1. The .... is an example of objects that allow light to pass through.
   a. lens
   b. paper
   c. wood
   d. mirror

2. A tube with muscles that help in pushing food into the stomach it's called ....
   a. trachea
   b. esophagus
   c. small intestine
   d. large intestine

3. All of the following are components of the nervous system except the ....
   a. spinal cord
   b. heart
   c. nerves
   d. brain

As roller coaster moves up or down, which of the following remains constant?
a. Object's speed
b. Kinetic energy
c. Potential energy
d. Object's mass

Honeybees can communicate with each other by ....
a. echolocation
b. flashvlights
c. dancing
d. Morse code

2 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Nerves	a. bronchioles
2 Branches inside the lungs that resemble tree branches	b. carry messages to the brain via the spinal cord.
3 Behavioral adaptation	c. the kapok tree emits beautiful scents to attract bats.
4 Vibrating motion	d. structural adaptation of some animals to see better at night.
5 Mirror-like membrane	e. a way to communicate between some animals

1 .... 2 .... 3 ....
4 .... 5 ....

Arrange the following steps in Newton's cradle:

(............) The ball moves toward the other balls.
(............) Kinetic energy transfers to all the other balls.
(............) The ball is raised up so it stores potential energy.
(............) The last ball moves.
(............) When the ball hits the first ball.
(............) Some kinetic energy changes to sound and heat energies.

Model Exam 15

hoose the correct answer:

We can say an object is in a state of motion when its .... changes

a. shape

b. size

c. color

d. position

When your eyes see a red traffic light, it sends a signal to you to ....

a. increase the speed

b. decrease the speed

c. keep your speed

d. start moving

.... puff up (blow) their bodies with the air to scare their enemies.

a. Bull sharks

b. Panther chameleons

c. Snakes

d. Jerboas

When light strikes an opaque object, ...

a. light reflects

b. light refracts

c. shadow is formed

d. light passes through it

.... have the ability to turn their heads in all directions.

a. Snakes

b. Jerboas

c. Dolphins

d. Owls

2 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Kilometer	a. it is the change in an object's position.
2 Respiration	b. it is the visible form of energy that is transmitted in the form of waves.
3 Energy	c. the force that pulls things downwards.
4 Gravity	d. the process of pushing air in and out of the body.
5 Motion	e. a measuring unit for long distances
6 Light	f. it is the ability to do work

1 .... 2 .... 3 ....

4 .... 5 .... 6 ....

3 Answer the following questions:

1. A dolphin can locate living organisms and things under the surface of the water. Explain the feature that helps the dolphin to do so.

....

....

2. There are some nocturnal animals that depend on their sharp senses to get their prey, give examples.

....

....

3. Snakes depend on identifying their prey and catching them at night by sensing heat. Determine the reason.

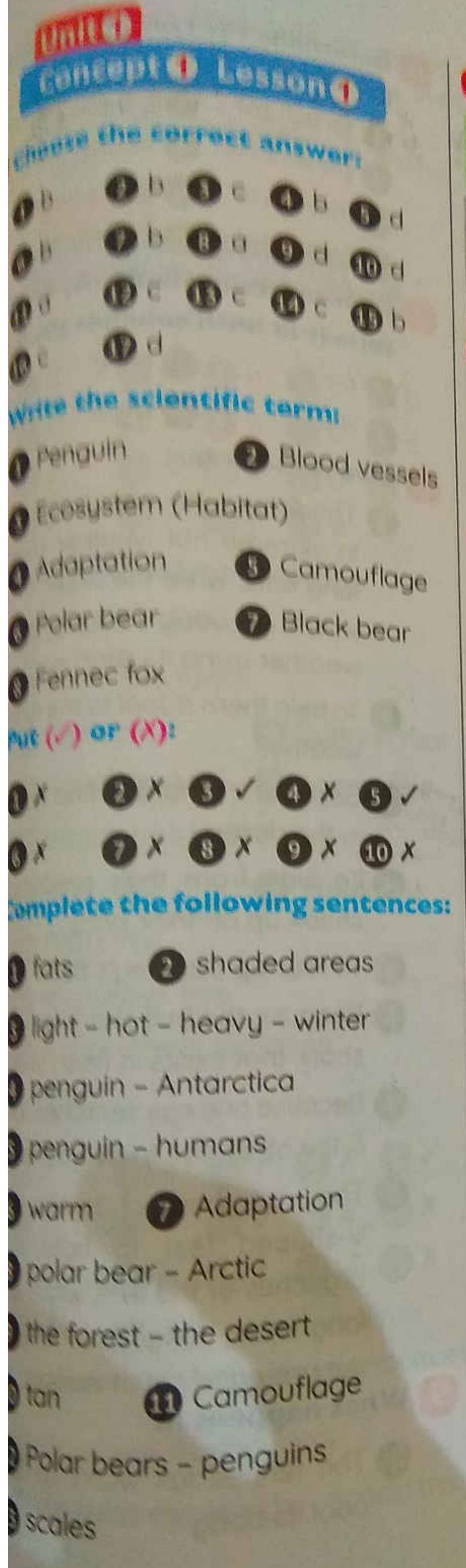
....

....

8 Guide Answers

Unit 1

Concept 1 Lesson 1



Choose the correct answer:

1. b 2. b 3. c 4. b 5. d
6. b 7. b 8. a 9. d 10. d
11. d 12. c 13. c 14. c 15. b
16. c 17. d

Write the scientific term:

1. Penguin 2. Blood vessels
3. Ecosystem (Habitat)
4. Adaptation 5. Camouflage
6. Polar bear 7. Black bear
8. Fennec fox

Put (✓) or (✗):

1. ✗ 2. ✗ 3. ✓ 4. ✗ 5. ✓
6. ✗ 7. ✗ 8. ✗ 9. ✗ 10. ✗

Complete the following sentences:

1. fats 2. shaded areas
3. light – hot – heavy – winter
4. penguin – Antarctica
5. penguin – humans
6. warm 7. Adaptation
8. polar bear – Arctic
9. the forest – the desert
10. tan 11. Camouflage
12. Polar bears – penguins
13. scales

5 Complete the following table:

P.O.C.	Fennec Fox	Polar Bear	Black Bear
Habitat	Desert	Arctic region	Forest
Fur Color	Tan	White	Black

6 Choose from column (A) what suits it in both columns (B) & (C):

1. d – d 2. a – b
3. e – e 4. c – a

7 Study the following then answer the questions:

1. (1) & (3) 2. (2)
3. (2), (5) & (6) 4. (5)

8 Give reasons for:

1. Because adaptation helps all living organisms to survive and reproduce in their habitat.
2. To adapt to the hot weather in summer.
3. To keep its body warm in the cold region.
4. Because in penguin's feet, the warm blood vessels weave around cold blood vessels to heat it up.
5. To hide from predators or prey.

9 What's happen if:

1. The animal may die.
2. Penguins can't be able to overcome the hot climate and they will die.

Unit 1
Concept 1 Lesson 2

1 Choose the correct answer:

1 b 2 c 3 a 4 c 5 b
6 d 7 b 8 c 9 b 10 b
11 a 12 c 13 d 14 b 15 c
16 c 17 b 18 b

2 Complete the following sentences:

1 behavioral
2 fennec foxes - Arctic foxes
3 warm - cool 4 tan - the desert
5 white - brown 6 smaller
7 fennec - Arctic
8 countershading 9 salt - fresh
10 independently - food - to avoid predators

3 Write the scientific term:

1 Behavioral adaptation
2 Bull shark 3 Fennec fox
4 Arctic fox
5 Structural adaptation

4 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✓
6 ✗ 7 ✓ 8 ✓

5 Campare between the following:

P.O.C.	Fennec Fox	Arctic Fox
abitat	Desert	Tundra
Fur olor	Tan	White in winter Brown in summer
hape Ears	Extra Large Ears	Small ears

6 Determine the type of adaptation in the following:

1 Structural 2 Behavioral
3 Behavioral 4 Behavioral
5 Structural 6 Behavioral
7 Structural 8 Structural

7 Choose from column (A) what suits it in both columns (B) & (c):

1 c - e 2 e - c
3 d - a 4 b - d

8 Give reasons for:

1 The fennec fox can cool its bod in extreme hot weather using it long ears, while the Arctic fox ca warm its body in extreme co weather using its short ears.
2 To help them adapt to the extrem weather.
3 Because it is hard to find any fo in the desert.
4 To hide from their predators sneak up on their prey.
5 To tear up the prey's flesh
6 Because the bull shark is the shark that exists in fresh wate
7 Because one eye searches for & the other eye to avoid dang
8 The panther chameleon V-shaped feet to hold o branches of the tree, while it long sticky tongue to hunt, the prey and catch insects.

9 What happens if:

1 The fennec fox won't be a cool its body.

2. It puffs its body with air, opens its mouth wide and changes the color of its scales.

3. It finds less competition in finding food.

Unit 1

Concept 1 Lesson 3

1 Choose the correct answer:

1. d 2. d 3. b 4. c 5. b
6. c 7. b 8. a 9. b 10. c
11. c 12. d 13. c 14. a 15. b
16. b 17. c 18. b 19. d

2 Write the scientific term:

1. Amazon rainforest
2. Savannah forest
3. Taproots 4. Buttress root
5. Kapok tree 6. Acacia tree
7. Kapok tree leaf
8. Pine tree 9. Water Lily
10. Palm tree
11. Mangrove tree
12. Behavioral adaptation

3 Put (✓) or (✗):

1. ✗ 2. ✗ 3. ✓ 4. ✗ 5. ✓
6. ✗ 7. ✓ 8. ✓ 9. ✗ 10. ✗
11. ✓ 12. ✗ 13. ✗ 14. ✓ 15. ✗
16. ✓ 17. ✓

4 Complete the following sentences:

1. structural - behavioral
2. Amazon rainforests - acacia trees
3. soggy - strong
4. drought- water
5. taproot- search for water in the deep soil 6. water - fats
7. giraffe 8. Barbary figs - spines
9. acacia tree
10. buttress - upward - soggy.
11. hand shaped - tearing 12. Bats
13. water lily - mangrove tree
14. triangular - short
15. thick - small - wind
16. long - strong - waves

5 Cross out the odd word:

1. Attract bats 2. Sharp spines
3. Pine tree
4. Savannah forests
5. Amazon rainforests

6 Compare between the following:

1.

P.O.C	Savannah Forests	Amazon Rainforests
Trees in the Forest	Acacia tree	Kapok tree
Characteristics	1. Grass 2. Drought 3. mild	1. Soggy 2. Easy 3. Strong winds

Final Revision

2

P.O.C	Acacia Tree	Kapok Tree
Habitat	Savannah forest	Amazon rainforest
Shape	Umbrella shape	Umbrella shape
Roots Name	Taproot roots	Buttress roots
Leaves	Tiny Leaves	Hand-shaped leaves

3

P.O.C	Palm Tree	Mangrove Tree
Habitat	Desert	Salty water
Roots Shape	Thick	Long - strong

4

P.O.C	Water Lily	Acacia Tree
Habitat	Wetland	Savannah forest
Leaves Shape	Wide	Tiny

7 Choose from column (A) what suits it in both column (B) & (c):

1. b - d
2. d - a
3. e - b
4. a - e

Determine is the type of adaptation in the following:

1. Structural
2. Behavioral
3. Structural
4. Structural
5. Structural

Study the following figures, then answer the questions:

1. (a) palm tree - the desert - tiny - resist strong winds.
   (b) acacia tree - savannah forest - tiny - hold water.
   (c) pine tree - the snow - needle - hold water.
   (d) kapok tree - Amazon rainforest - tiny - allow wind to move through without cutting it.
2. Figures (2), (4) have umbrella shape. Figure (3) has a triangular shape.
3. Figure (2) has taproot roots. Figure (3) has buttress roots.

10 Give reasons for:

1. Because plants have structural & behavioral adaptations that help them survive.
2. Taproot roots help acacia trees to search for water in the deep soil, while buttress roots fix kapok trees firmly in the soggy soil.
3. Tiny leaves help acacia trees hold water, while spines protect it from hungry animals.
4. To allow wind to move gently through it without tearing or cutting it.
5. To absorb the sunlight.
6. To resist strong wind in the desert.
7. To allow snow to slide easily on it without breaking its branches.

11 What happens if:

1. Acacia roots won't reach water from the deep soil.
2. The acacia tree begins to produce poison to protect itself.

The palm tree won't be able to resist winds and it may die.

The snow will break the branches of the pine tree.

Unit 1

Concept 1 Lesson 4

Choose the correct answer:

1 c 2 d 3 d 4 a 5 c
6 b 7 a 8 a 9 b 10 c
11 d 12 b 13 c 14 b 15 d
16 c 17 b 18 c 19 b 20 d
21 a 22 b 23 d 24 c 25 d

Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✗ 9 ✓ 10 ✗
11 ✓ 12 ✓ 13 ✗ 14 ✓ 15 ✗
16 ✗ 17 ✓ 18 ✗ 19 ✗

Write the scientific term

1 Digestive system 2 Mouth
3 Saliva 4 Stomach
5 Esophagus
Large intestine
Small intestine 8 Blood
Small intestine 10 Inhalation
Alveoli 12 Blood
Diaphragm 14 Exhalation

Cross out the odd word:

1 Trachea 2 Liver
3 Throat 4 Chest size decreases

5 Classify these organs according to the systems they belong to:

Digestive System	Respiratory System
Pharynx	Pharynx
Stomach -	Diaphragm
Anus - Tongue	Trachea
Liver	Nose
Small intestine	Lungs
	Alveoli

6 Complete the following sentences:

1 specific function. 2 organs
3 Digestive - respiratory
4 digestive 5 mouth - anus
6 Digestion
7 Teeth - tongue 8 esophagus
9 stomach - esophagus
10 stomach acids - digestive juices - a soupy Liquid
11 hours - the small intestine
12 Liver- pancreas - small substances.
13 The blood
14 water - solid waste - anus
15 sitting - quickens
16 oxygen - carbon dioxide
17 trachea - bronchioles
18 alveoli 19 blood.
20 inhalation - exhalation
21 contracts - oxygen - increases
22 relaxes - carbon dioxide - decreases
23 respiratory 24 vitamin C

7 Compare between the following:

1

P.O.C	Digestive System	Respiratory System
Function	To get the needed energy from food & growth.	To supply the body with oxygen gas and get rid of carbon dioxide gas.
Organs	Mouth- Pharynx Stomach - Liver	Nose - Pharynx Trachea Lungs

2

P.O.C	Stomach	Lungs
System	Digestive system	Respiratory system
unction	Convert food into a soupy liquid.	Extract oxygen from the air & expel carbon dioxide out of the body.

3

P.O.C	inhalation	Exhalation
aphragm	Contracts	Relaxes
hest Size	Increases	Decrease
Rich in	Oxygen gas	Carbon dioxide gas

Choose from column (A) what uits it in column (B):

:

d 2 f 3 a

b 5 e 6 c

B:

1 c 2 d 3 b 4 a

9 Label the following figures:

Figure (A)

1 Mouth 2 Esophagus
3 Liver 4 Stomach
5 Pancreas 6 Large intestine
7 Small intestine

Figure (B)

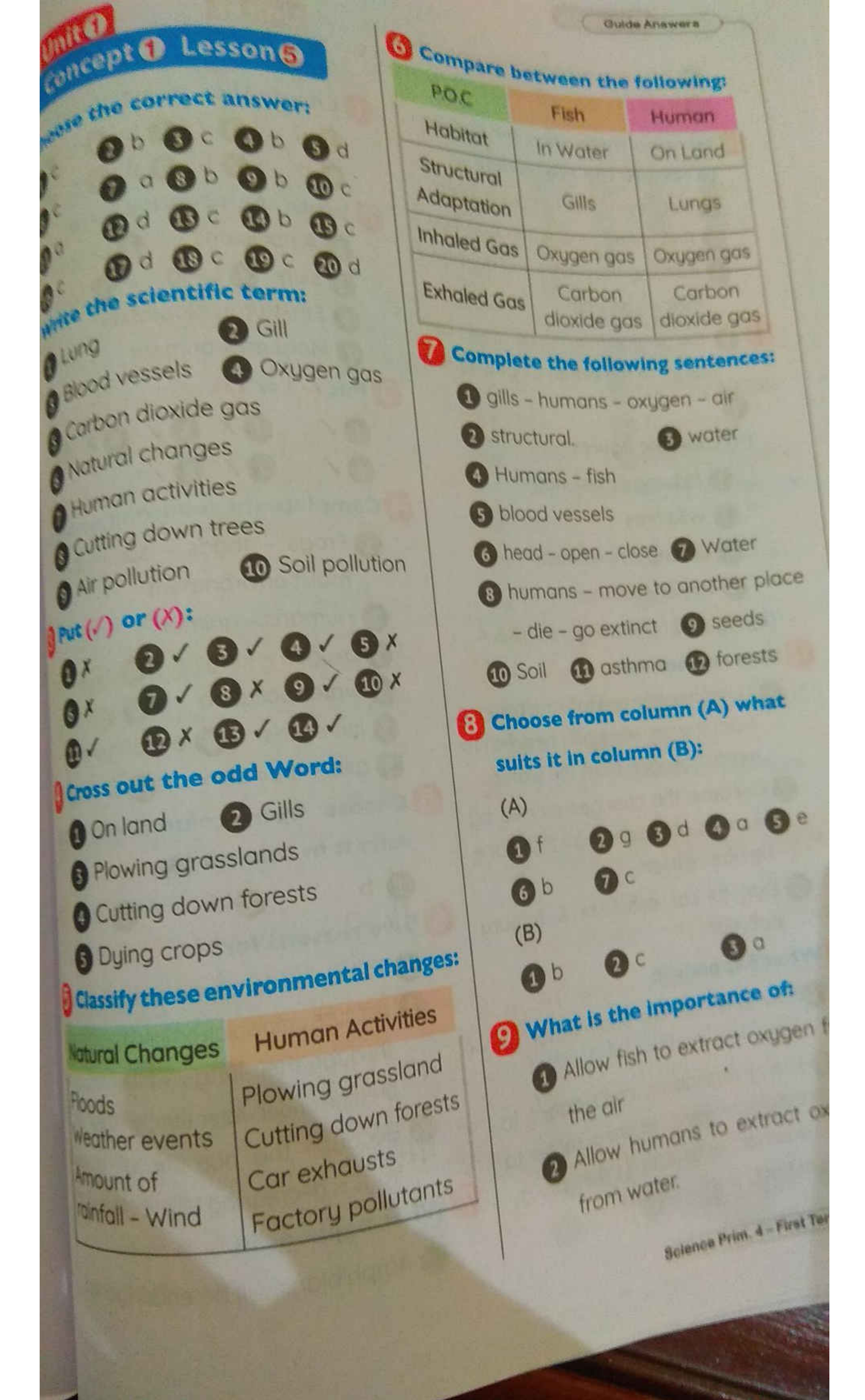
1 Nose 2 Pharynx
3 Trachea 4 Lungs
5 Diaphragm

10 Give reasons for:

1. To get the energy needed from food that allow humans to do all activities.
2. Teeth and tongue crush food during chewing and saliva facilitates swallowing food.
3. Because they secrete juices that help in breaking down food into nutrients.
4. Because the diaphragm directs inhalation & exhalation processes.
5. To keep the respiratory system healthy.
6. To keep the digestive system healthy.

11 What happens if:

1. Swallowing food becomes very difficult.
2. They will harm our digestive system.
3. This will harm our respiratory system.
4. Carbon dioxide gas will be expelled out of the body.



Unit 1 Concept 1 Lesson 5

1 Choose the correct answer:

1 c 2 b 3 c 4 b 5 d
6 c 7 a 8 b 9 b 10 c
11 a 12 d 13 c 14 b 15 c
16 c 17 d 18 c 19 c 20 d

2 Write the scientific term:

1 Lung 2 Gill
3 Blood vessels 4 Oxygen gas
5 Carbon dioxide gas
6 Natural changes
7 Human activities
8 Cutting down trees
9 Air pollution 10 Soil pollution

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✗ 9 ✓ 10 ✗
11 ✓ 12 ✗ 13 ✓ 14 ✓

4 Cross out the odd Word:

1 On land 2 Gills
3 Plowing grasslands
4 Cutting down forests
5 Dying crops

5 Classify these environmental changes:

Natural Changes	Human Activities
Floods Weather events Amount of rainfall - Wind	Plowing grassland Cutting down forests Car exhausts Factory pollutants

6 Compare between the following:

P.O.C	Fish	Human
Habitat	In Water	On Land
Structural Adaptation	Gills	Lungs
Inhaled Gas	Oxygen gas	Oxygen gas
Exhaled Gas	Carbon dioxide gas	Carbon dioxide gas

7 Complete the following sentences:

1 gills - humans - oxygen - air
2 structural. 3 water
4 Humans - fish
5 blood vessels
6 head - open - close 7 Water
8 humans - move to another place - die - go extinct 9 seeds
10 Soil 11 asthma 12 forests

8 Choose from column (A) what suits it in column (B):

(A)
1 f 2 g 3 d 4 a 5 e
6 b 7 c

(B)
1 b 2 c 3 a

9 What is the importance of:

1 Allow fish to extract oxygen f[rom] the air.
2 Allow humans to extract ox[ygen] from water.

3. It is very important for respiration.
4. It carries oxygen to all body parts.

10 Mention three ways for human to restore the ecosystem:

1. Replanting the removed forest.
2. Preventing air & water pollution.
3. Keeping the plants and animals in their ecosystem.

11 1. The penguin may die, because it can't adapt to the extreme hot weather.

2.

(a) Label the figures:

1. Plowing grasslands
2. Wild fires
3. Cutting down forests
4. Factory pollution

(b) Figure 2 (c) Figures 1, 3 & 4

Give reasons for:

1. Lungs help humans to extract oxygen from the air, while gills help fish to extract oxygen from the water.
2. Because the changes caused by humans are faster than that done by nature itself.
3. Due to car exhausts & factory pollution.

What happens if:

1. Humans can live underwater like fish.
2. Living organisms can't adapt to these changes, so they move to another ecosystem, die or go extinct.

Unit 1

Concept 1 Lesson 6

1 Choose the correct answer:

1. d 2. c 3. b 4. c 5. c
6. d 7. b 8. d 9. c 10. c

2 Write the scientific term:

1. Amphibians 2. Oxygen gas
3. Skin 4. Lung 5. Scientists
6. Structural adaptation
7. Moist environment

3 Put (✓) or (✗):

1. ✓ 2. ✗ 3. ✓ 4. ✗ 5. ✓
6. ✓ 7. ✗ 8. ✓

4 Complete the following sentences:

1. Frogs - toads - salamanders - moist environment
2. Humans - animals
3. oxygen - lungs 4. skin
5. water pollution 6. structural
7. increases 8. endangered
9. gills - their skin 10. Drought

5 Choose from column (A) what suits it in column (B):

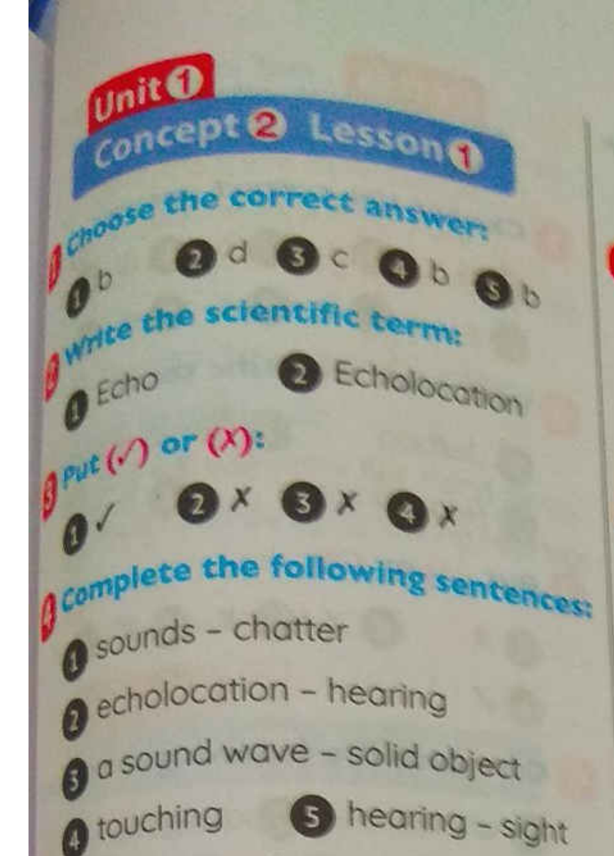
1. b 2. d 3. a

6 Give reasons for:

1. To help endangered species survive
2. Because amphibian on land can breathe through their lungs, while they can breathe underwater through their skin.
3. Because the number of golden frogs is decreasing all over the world

7 What happens if:

- Amphibians will be endangered



Unit 1

Concept 2 Lesson 1

1 Choose the correct answer:

1 b 2 d 3 c 4 b 5 b

2 Write the scientific term:

1 Echo 2 Echolocation

3 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗

4 Complete the following sentences:

1 sounds – chatter
2 echolocation – hearing
3 a sound wave – solid object
4 touching 5 hearing – sight
6 sight – smell

5 Classify the following animals:

Hunting Strategy	Animal
Countershading	Bull shark
Echolocation	Dolphin – Bat
Camouflage	Fennec fox – Chameleon

6 Give reasons for:

1 To move to another places to look for food.

2 because dolphins use echolocation where they produce sound waves, then the sound waves transfer in the water, then they hit the prey and bounce to the dolphin in the form of echo that allows them to locate the prey.

Unit 1

Concept 2 Lesson 2

1 Choose the correct answer:

1 d 2 d 3 a 4 b 5 b
6 c 7 d 8 d 9 c 10 a
11 b 12 d 13 c 14 a 15 d
16 c 17 c

2 Write the scientific term:

1 Echolocation 2 Snake
3 Owl 4 Nervous system
5 Brain 6 Spinal cord
7 Nerves 8 Sensory receptors

3 Complete the following sentences:

1 Night
2 Echolocation- darkness
3 Its head 4 Brain
5 eyes – heart 6 a response

4 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓
6 ✗ 7 ✓ 8 ✓

5 Classify the following words in the table:

Senses		Sensory Organs	
1. Sight	2. Smell	1. Eyes	2. Nose
3. Touch	4. Hear	3. Skin	4. Ears
5. Taste		5. Tongue	

6 Choose from column (A) what suits it in column (B):

(A):
1 d 2 c 3 e 4 b 5 a

(B):
1 d 2 c 3 a 4 e 5 b

7 Study the following figure, then answer the questions:

1 The nervous system
2 No
3 The nervous system gathers information from the environment and translates it, then gives the body a response.
4 1. Brain 2. Spinal cord 3. Nerves

8 Study the following figures, then completes the sentences:

(a) 2 (b) 3 (c) 1
(d) nocturnal - night

9 Give reasons for:

1 To surprise their prey in the darkness.
2 Because the snake senses the heat of its prey by a special body part in its face.
3 Because bats use echolocation to hunt, where they produce sound waves, then the sound waves transfer in the air and hit the prey's body and bounce to bats in the form of echo.
4 to direct sound to its ears.
5 because the brain processes and translates information from the environment and gives a proper response.

What happens if:

The sound waves bounce from the insect to the bat in the form of echo.
It will not find the prey and die.
The brain will translate it to give a response.

Unit 1
Concept 2 Lesson 3

1 Choose the correct answer:

1 b 2 c 3 b 4 d 5 a
6 c 7 b 8 c 9 d 10 c

2 Write the scientific term:

1 Jerboa 2 Nervous system
3 Reaction time 4 Brain

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓
6 ✓

4 Complete the following sentences:

1 withdraw 2 danger
3 rodent - large - eyes - long
4 zigzag 5 ear - brain
6 reaction time

5 Arrange the following steps:

1 On hearing danger, the sensory receptors sense it.
2 The sensory receptors in the ears send a message to the brain.
3 The brain translates the message.
4 The brain sends a response to alert the legs of the jerboa.
5 The jerboa jumps in zigzag paths quickly.

6 Choose from column (A) what suits it in column (B):

1 d 2 a 3 c

Give reasons for:

1. Because the nervous system protects them from danger.
2. To hear nearby predators.
3. To jump away quickly when hearing a danger nearby.
4. To catch sand during jumping.

What happens if:

1. She will withdraw her hand away.
2. It will jump away by its long hind legs
3. It will not hear nearby snakes which will hunt it.

Unit 1

Concept 2 Lesson 4

Choose the correct answer:

1 a 2 c 3 b 4 c 5 d
6 d 7 a 8 c 9 d 10 b

Write the scientific term:

1. Reaction time
2. Nervous system
3. Brain 4 Nerve

Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✗
6 ✓ 7 ✓

Complete the following sentences:

1 faster 2 together
3 hand- signal- response
4 less 5 visual
6 less than

Arrange the following steps:

1. The mobile makes sounds.
2. The sensory receptors in the ears sense the sound.

3. The sensory receptors send a signal to the brain.
4. The brain translates the signal.
5. The brain sends a response to the muscles.
6. Sara holds the mobile to answer the call.

6 Classify the following situations:

	Visual Response	Auditory Response
1	✓	
2		✓
3		✓
4	✓	
5		✓
6		✓
7	✓	
8		✓

7 Give reasons for:

1. Because reaction time of the visual stimuli is faster than the reaction time of the auditory stimuli.
2. Because the information from the environment (hot object) is received by the sensory receptors it in the sense organ (skin), then it sends signal to nerves then send signal to brain, then the brain responds (moving your hand away).

8 What happens if:

3. I will press the brakes to stop the car.
4. I will pay attention to him/her.

Unit 1

Concept 2 Lesson 5

1 Choose the correct answer:

1 b 2 c 3 d 4 c 5 b
6 d 7 b 8 c 9 d 10 c

2 Write the scientific term:

1 Sensory receptors
2 Nerves 3 Brain
4 Reflexes 5 Skin
6 Touch

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✓
6 ✗ 7 ✓ 8 ✓

Complete the following sentences:

1 sensory receptor 2 brain
3 nerves
4 Reflex 5 ears
6 Hearing

Cross out the odd word:

1 Lungs 2 Touch
3 Tongue

ompare between:

.C	Sensory Receptors	Brain
on	Collect information from the environment.	Translates and processes information to give a response.

ly the following figures, and complete:

(b) 3 (c) 1 (d) 4

8 Arrange the following steps:

1 (a) 5 (b) 2 (c) 4 (d) 1 (e) 3
2 (a) 5 (b) 1 (c) 3 (d) 2 (e) 4

9 Give reasons for:

1 It collects information from the environment by the sensory receptors, then sends them to the brain to translate and process information to give a response.
2 Due to the reflex.

Unit 1

Concept 3 Lesson 1

1 Choose the correct answer:

1 c 2 b 3 d 4 b 5 a
6 b 7 d 8 d 9 c

2 Write the scientific term:

1 Nocturnal animals
2 Fishing cats 3 Light energy
4 Light sources 5 The sun
6 Night vision goggles

3 Put (✓) or (✗):

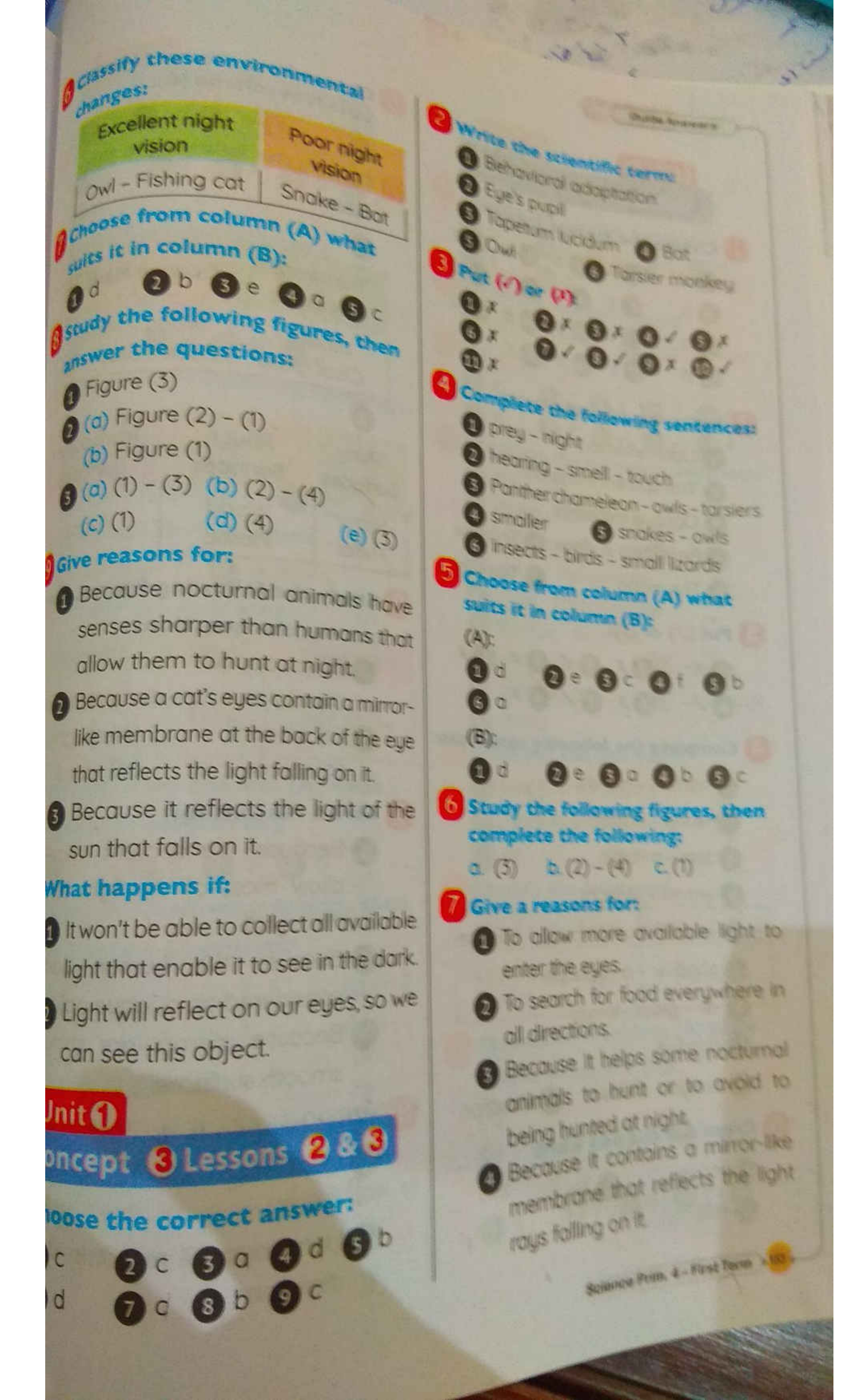
1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✗
6 ✗ 7 ✗ 8 ✓

4 Complete the following sentences:

1 Bats – snakes – owls – fishing cats
2 different 3 light source
4 better
5 night vision goggles
6 back – cats 7 The nervous system

5 Cross out the odd word:

1 Fishing cats 2 Moon



6 Classify these environmental changes:

Excellent night vision	Poor night vision
Owl - Fishing cat	Snake - Bat

7 Choose from column (A) what suits it in column (B):

1 d 2 b 3 e 4 a 5 c

8 Study the following figures, then answer the questions:

1 Figure (3)
2 (a) Figure (2) - (1)
(b) Figure (1)
3 (a) (1) - (3) (b) (2) - (4)
(c) (1) (d) (4) (e) (3)

9 Give reasons for:

1 Because nocturnal animals have senses sharper than humans that allow them to hunt at night.
2 Because a cat's eyes contain a mirror-like membrane at the back of the eye that reflects the light falling on it.
3 Because it reflects the light of the sun that falls on it.

What happens if:

1 It won't be able to collect all available light that enable it to see in the dark.
2 Light will reflect on our eyes, so we can see this object.

Unit 1

Concept 3 Lessons 2 & 3

Choose the correct answer:

1 c 2 c 3 a 4 d 5 b
6 d 7 c 8 b 9 c

2 Write the scientific term:

1 Behavioral adaptation
2 Eye's pupil
3 Tapetum lucidum 4 Bat
5 Owl 6 Tarsier monkey

3 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✗ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✓ 9 ✗ 10 ✓
11 ✗

4 Complete the following sentences:

1 prey - night
2 hearing - smell - touch
3 Panther chameleon - owls - tarsiers
4 smaller 5 snakes - owls
6 insects - birds - small lizards

5 Choose from column (A) what suits it in column (B):

(A):
1 d 2 e 3 c 4 f 5 b
6 a

(B):
1 d 2 e 3 a 4 b 5 c

6 Study the following figures, then complete the following:

a. (3) b. (2) - (4) c. (1)

7 Give a reasons for:

1 To allow more available light to enter the eyes.
2 To search for food everywhere in all directions.
3 Because it helps some nocturnal animals to hunt or to avoid to being hunted at night.
4 Because it contains a mirror-like membrane that reflects the light rays falling on it.



Unit 1

Concept 3 Lesson 4

1 Choose the correct answer:

1 d 2 b 3 d 4 c 5 c
6 b 7 c 8 d 9 d 10 d
11 b 12 a 13 b 14 b 15 a
16 d 17 c 18 b 19 c

2 Write the scientific term:

1 Light reflection
2 Transparent materials
3 Opaque materials
4 Reflecting surface 5 Shadow
6 The moon 7 The sun

Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✓ 4 ✗ 5 ✗
6 ✓ 7 ✗ 8 ✓ 9 ✗

Complete the following sentences:

1 mirrors - metals
2 wood - papers
3 less - a rough
waves - straight
Wood - human body - opaque
shadow - an opaque
air - glass -lenses
opaque
Rough - diffuse 10 direction

ss out the odd word:

Moon 2 Air
Milk

6 Choose from column (A) what suits it in column (B):

1 c 2 e 3 d 4 a 5 b

7 Classify the following in this table:

1

Transparent Mediums	Opaque Mediums
Lenses - Clear glass	Wood - Metal - Book - Skin - Milk

2

Shiny Surfaces	Rough Surfaces	Transparent Surfaces
Mirror Metal	Wood Plastic	Glass

8 Study the following figures, then answer the questions:

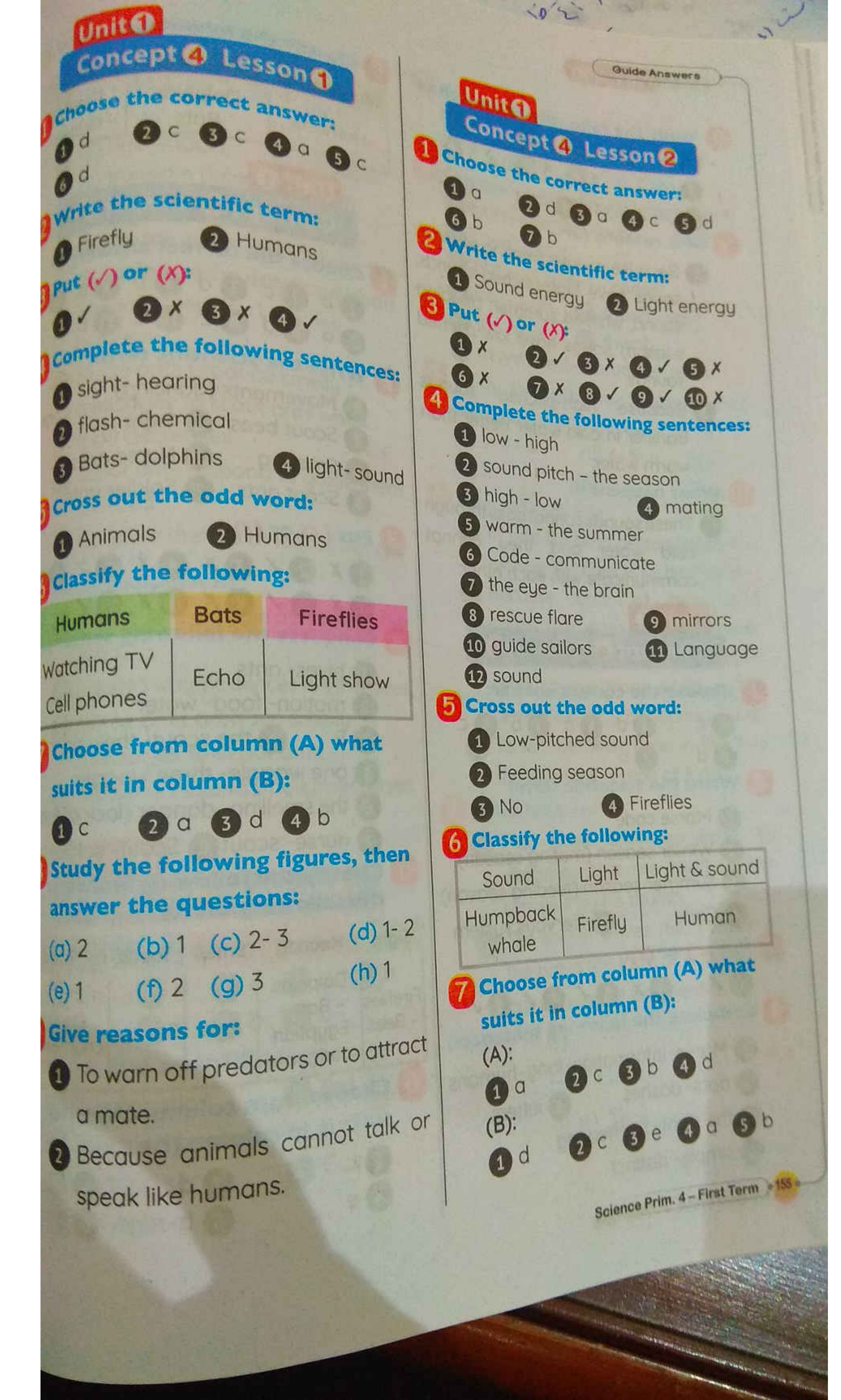
1 (a) an opaque
(b) a light source - opaque materials
2 (a) smooth (b) rough
(c) mirror (d) wood

9 Give a reasons for:

1 Because transparent materials allow most of the light to pass through it.
2 Because the human body is considered an opaque object.
3 Because mirrors are shiny and smooth surfaces.

10 What happen is if:

1 Light rays will reflect in one direction.
2 Light rays will reflect in different directions.



Unit 1

Concept 4 Lesson 1

1 Choose the correct answer:

1 d 2 c 3 c 4 a 5 c
6 d

2 Write the scientific term:

1 Firefly 2 Humans

3 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✓

4 Complete the following sentences:

1 sight- hearing
2 flash- chemical
3 Bats- dolphins 4 light- sound

5 Cross out the odd word:

1 Animals 2 Humans

6 Classify the following:

Humans	Bats	Fireflies
Watching TV Cell phones	Echo	Light show

7 Choose from column (A) what suits it in column (B):

1 c 2 a 3 d 4 b

8 Study the following figures, then answer the questions:

(a) 2 (b) 1 (c) 2- 3 (d) 1- 2
(e) 1 (f) 2 (g) 3 (h) 1

9 Give reasons for:

1 To warn off predators or to attract a mate.
2 Because animals cannot talk or speak like humans.

Unit 1

Concept 4 Lesson 2

1 Choose the correct answer:

1 a 2 d 3 a 4 c 5 d
6 b 7 b

2 Write the scientific term:

1 Sound energy 2 Light energy

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✗
6 ✗ 7 ✗ 8 ✓ 9 ✓ 10 ✗

4 Complete the following sentences:

1 low - high
2 sound pitch - the season
3 high - low 4 mating
5 warm - the summer
6 Code - communicate
7 the eye - the brain
8 rescue flare 9 mirrors
10 guide sailors 11 Language
12 sound

5 Cross out the odd word:

1 Low-pitched sound
2 Feeding season
3 No 4 Fireflies

6 Classify the following:

Sound	Light	Light & sound
Humpback whale	Firefly	Human

7 Choose from column (A) what suits it in column (B):

(A):
1 a 2 c 3 b 4 d

(B):
1 d 2 c 3 e 4 a 5 b

Study the following figures, then answer the questions:

1. (a) 1 (b) 3 (c) 3 (d) 4 (e) 1- 2 (f) 1
2. (a) one waggle (b) 3 waggle (c) translate (interpret)- sight

Give reasons for:

1. To tell the other bees about the distance and the direction of food.
2. Because they can't talk like humans.
3. Nurse ants produce smelly messages to scout ants when food decreases.
4. Scout ants respond to guide them for food.
5. Because there is a nearby danger.

What happens if:

1. It does one waggle dance to other bees.
2. It does 3 waggle dances to other bees.
3. Nurse ants produce smelly messages to scout ants.
4. Soldier ants send smelly messages.

Unit 1

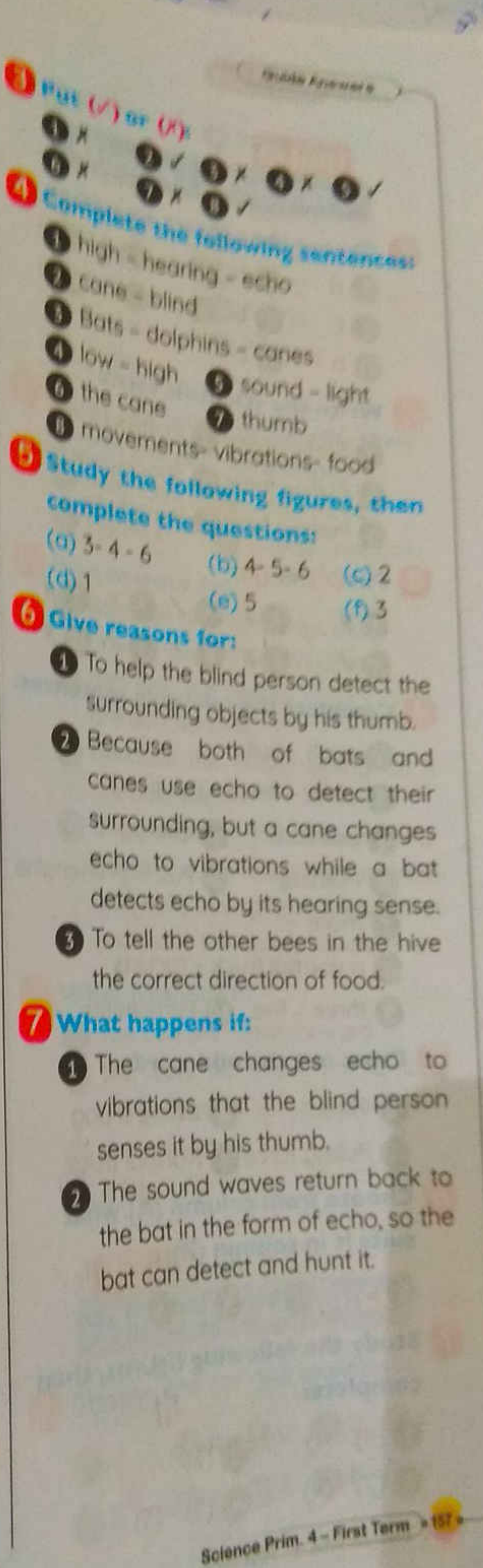
Concept 4 Lesson 5

1 Choose the correct answer:

1 c 2 d 3 c 4 d 5 b
6 c 7 d 8 b 9 c

2 Write the scientific term:

1. Echolocation
2. Bat
3. Touching sense
4. Hearing sense
5. Cane
6. Honeybee



3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓
6 ✗ 7 ✗ 8 ✓

4 Complete the following sentences:

1. high - hearing - echo
2. cane - blind
3. Bats - dolphins - canes
4. low - high
5. sound - light
6. the cane
7. thumb
8. movements- vibrations- food

5 Study the following figures, then complete the questions:

(a) 3- 4 - 6 (b) 4- 5- 6 (c) 2
(d) 1 (e) 5 (f) 3

6 Give reasons for:

1. To help the blind person detect the surrounding objects by his thumb.
2. Because both of bats and canes use echo to detect their surrounding, but a cane changes echo to vibrations while a bat detects echo by its hearing sense.
3. To tell the other bees in the hive the correct direction of food.

7 What happens if:

1. The cane changes echo to vibrations that the blind person senses it by his thumb.
2. The sound waves return back to the bat in the form of echo, so the bat can detect and hunt it.

Unit 2

Concept 1 Lesson 1

1 Choose the correct answer:

1 d 2 d 3 c 4 d 5 d
6 c 7 b 8 c 9 b 10 d
11 b 12 c

2 Write the scientific term:

1 Static object 2 Pushing force
3 Pulling force 4 Shockwave truck
5 Pushing force 6 Parachute

Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✓ 4 ✗ 5 ✗
6 ✓ 7 ✗ 8 ✓ 9 ✓ 10 ✗

Complete the following sentences:

1 push - pull
2 static - force - position
3 position 4 energy
5 Pushing 6 Pushing - an engine
7 more
8 a normal truck - rockets
9 three - five 10 Parachutes

ross out the odd word:

1 Time 2 Lifting a bag
3 Pulling force 4 Normal truck

oose from column (A) what ts it in column (B):

1 c 2 e 3 b 4 d

dy the following figures, then nplete:

1 (4) - (1) 2 (2)
3 (2) - (4) 4 (2) - (3)

8 Study the following figures, then mention the kind of force:

1 Pushing 2 Pulling
3 Pushing 4 Pulling

9 Give reasons for:

1 Because pushing force means that you move the objects away from you, while pulling force means that you move the objects toward you.
2 Because when you kick the ball, it moves away from you.
3 Because when you lift the bag, it moves toward you.
4 Because jet air plane's engines are more powerful than normal trucks.
5 Because Shockwave truck is fitted with three jet engines.
6 Because parachutes help to decrease the speed of the Shockwave truck.

10 What happens if:

1 The state of the object will change and the object will change its position.
2 The speed of the Shockwave truck will decrease.

Unit 2

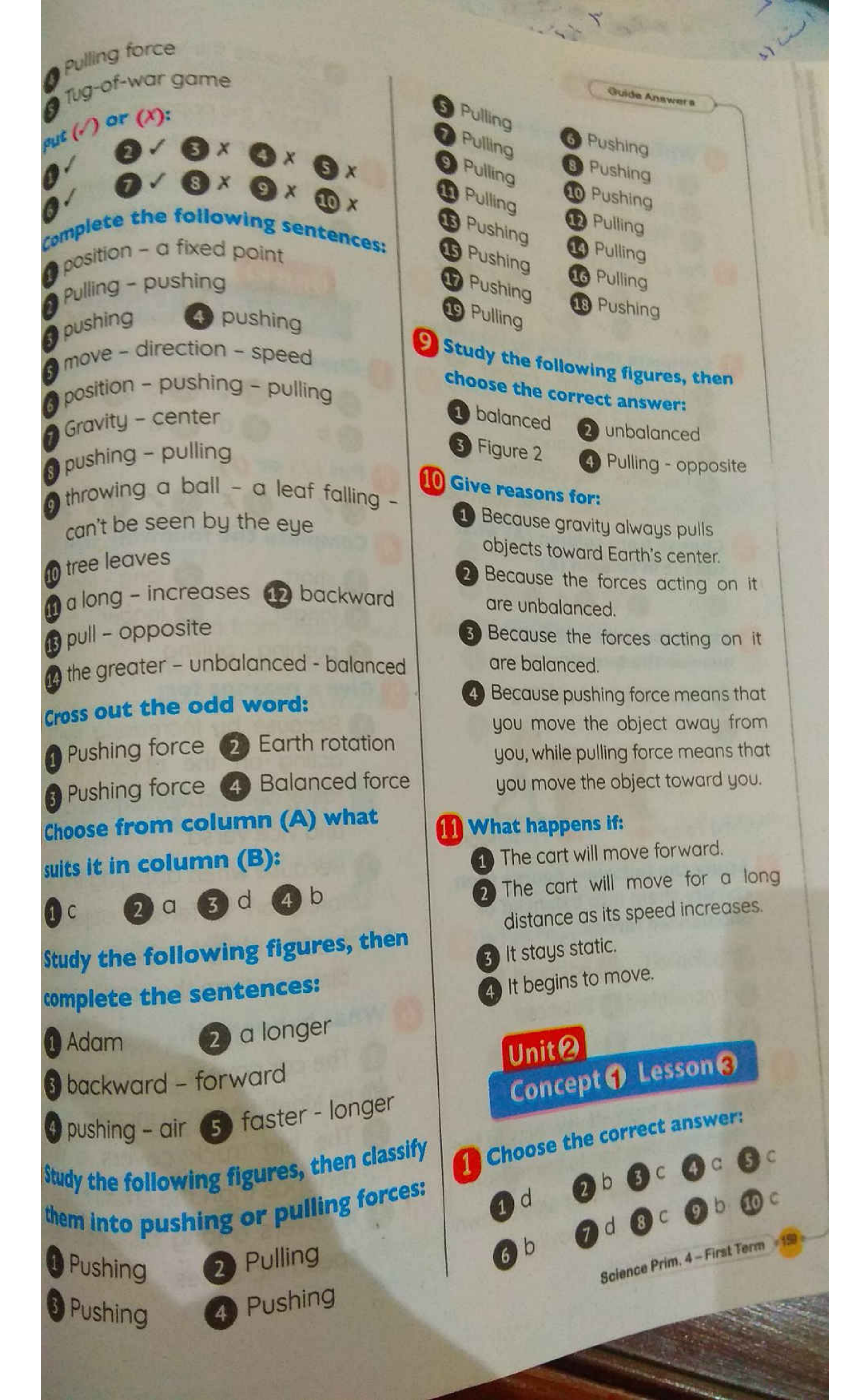
Concept 1 Lesson 2

1 Choose the correct answer:

1 d 2 b 3 c 4 b 5 b
6 c 7 b 8 c 9 d 10 c

2 Write the scientific term:

1 Motion 2 Gravity
3 Pushing force



4 Pulling force
5 Tug-of-war game

Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✗ 5 ✗
6 ✓ 7 ✓ 8 ✗ 9 ✗ 10 ✗

Complete the following sentences:

1 position – a fixed point
2 Pulling – pushing
3 pushing 4 pushing
5 move – direction – speed
6 position – pushing – pulling
7 Gravity – center
8 pushing – pulling
9 throwing a ball – a leaf falling – can't be seen by the eye
10 tree leaves
11 a long – increases 12 backward
13 pull – opposite
14 the greater – unbalanced - balanced

Cross out the odd word:

1 Pushing force 2 Earth rotation
3 Pushing force 4 Balanced force

Choose from column (A) what suits it in column (B):

1 c 2 a 3 d 4 b

Study the following figures, then complete the sentences:

1 Adam 2 a longer
3 backward – forward
4 pushing – air 5 faster - longer

Study the following figures, then classify them into pushing or pulling forces:

1 Pushing 2 Pulling
3 Pushing 4 Pushing
5 Pulling 6 Pushing
7 Pulling 8 Pushing
9 Pulling 10 Pushing
11 Pulling 12 Pulling
13 Pushing 14 Pulling
15 Pushing 16 Pulling
17 Pushing 18 Pushing
19 Pulling

9 Study the following figures, then choose the correct answer:

1 balanced 2 unbalanced
3 Figure 2 4 Pulling - opposite

10 Give reasons for:

1 Because gravity always pulls objects toward Earth's center.
2 Because the forces acting on it are unbalanced.
3 Because the forces acting on it are balanced.
4 Because pushing force means that you move the object away from you, while pulling force means that you move the object toward you.

11 What happens if:

1 The cart will move forward.
2 The cart will move for a long distance as its speed increases.
3 It stays static.
4 It begins to move.

Unit 2
Concept 1 Lesson 3

1 Choose the correct answer:

1 d 2 b 3 c 4 a 5 c
6 b 7 d 8 c 9 b 10 c



2 **Write the scientific term:**

1. Force
2. Unbalanced forces
3. Balanced forces
4. Friction force

3 **Put (✓) or (✗):**

1 ✓ 2 ✓ 3 ✓ 4 ✗ 5 ✓
6 ✗ 7 ✗ 8 ✓

4 **Complete the following sentences:**

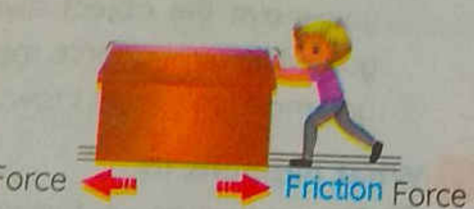
1. Gravity - friction - motion
2. upward - downward
3. greater - unbalanced
4. the same - the opposite
5. Friction - opposite - slows down - stops

5 **Choose from column (A) what suits it in column (B):**

1 b 2 c 3 d 4 a

6 **Study the following figures, then answer the questions:**

1. (a) pulling (b) pushing
2.



Study the following figures then classify them into balanced or unbalanced forces:

1 Balanced 2 Balanced
3 Unbalanced 4 Balanced
5 Balanced 6 Unbalanced

ive reasons for:

- Because friction force acts in the opposite direction to the motion.
- Because friction force slows down the bike till it stops moving.
3. Because the wall applied a force to the car with the same amount and in the opposite direction.

9 **What happens if:**

1. The bike's speed decreases till it stops.
2. The car stops moving.

Unit 2

Concept 1 Lesson 4

1 **Choose the correct answer:**

1 d 2 c 3 b 4 c 5 d
6 b 7 d 8 a

2 **Put (✓) or (✗):**

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✗

4 **Complete the following sentences:**

1. short
2. long - increases
3. longer
4. longer
5. pushing - pulling

5 **Give a reasons for:**

1. Because by increasing the force acting on the object, it moves faster and it covers a long distance and vice versa.
2. Because when applying the same force on different objects, the bigger object covers a shorter distance than the small object.

6 **What happens if:**

1. The car covers a short distance.
2. Its kinetic energy increases.
3. The big truck covers a shorter distance than the small car.
4. It covers a long distance and its speed increases.



Unit 2
Concept 1 Lesson 5

1 Choose the correct answer:

1 b 2 c 3 d 4 a 5 c

2 Write the scientific term:

1 Force 2 Energy 3 Work

3 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✗
6 ✗

4 Complete the following sentences:

1 pushing – pulling
2 energy – work
3 stays static
4 moves
5 Force – work

5 Give reason for:

1 Because living organisms get the energy needed from eating food.
2 Because the car's position changes.
3 Because the wall doesn't move.

Unit 2
Concept 2 Lesson 1

1 Choose the correct answer:

1 b 2 d 3 c 4 c 5 d
6 b 7 d 8 c 9 d 10 b

2 Write the scientific term:

1 Potential energy
2 Kinetic energy
3 Electrical energy

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓

4 Complete the following sentences:

1 potential – kinetic
2 the ground – the ramp
3 sliding down 4 kinetic
5 electricity – motors
6 upward – potential – decreases

5 Cross out the odd word:

1 Object's speed
2 Object's height

6 Choose from column (A) what suits it in column (B):

1 e 2 d 3 b 4 a

7 Study the following figure then complete:

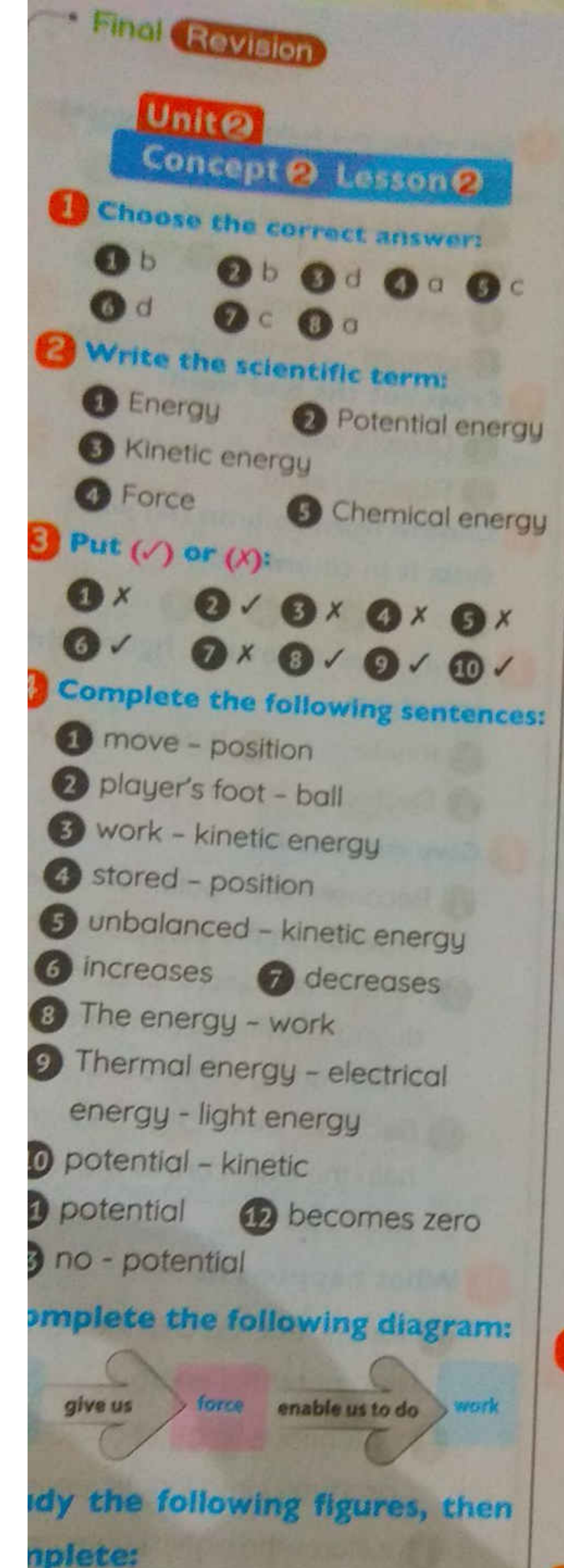
1 Kinetic 2 Potential 3 A
4 Electricity – motors

8 Give reasons for:

1 Because the potential energy depends on the object's height.
2 Because an object's speed increases during moving downward, so its kinetic energy increases.
3 Because electricity and motors help the train cars to move up the roller coaster.

9 What happens if:

1 Kinetic energy changes gradually into potential energy.
2 Potential energy changes gradually into kinetic energy.
3 It stores the highest potential energy.
4 It loses its potential and kinetic energies.



Unit 2

Concept 2 Lesson 2

1 Choose the correct answer:

1 b 2 b 3 d 4 a 5 c
6 d 7 c 8 a

2 Write the scientific term:

1 Energy 2 Potential energy
3 Kinetic energy
4 Force 5 Chemical energy

3 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✗
6 ✓ 7 ✗ 8 ✓ 9 ✓ 10 ✓

4 Complete the following sentences:

1 move - position
2 player's foot - ball
3 work - kinetic energy
4 stored - position
5 unbalanced - kinetic energy
6 increases 7 decreases
8 The energy - work
9 Thermal energy - electrical energy - light energy
10 potential - kinetic
11 potential 12 becomes zero
13 no - potential

omplete the following diagram:

give us → force → enable us to do → work

udy the following figures, then nplete:

potential - kinetic
potential (c) no

7 Give reasons for:

1 Becauses the static book on the table stores potential energy.
2 Because when the apple falls from the tree, its speed increases.
3 Because the ball gains kinetic energy when you kick it.
4 Because humans need the chemical energy stored in food to grow and move.
5 Because we can see the effect of energy on objects when the objects change their positions.

8 What happens if:

1 The kinetic energy of the basketball is changed gradually into potential energy.
2 The potential energy of the book changes gradually into Kinetic energy.
3 The ball gains kinetic energy.
4 The potential energy of the book increases.

Unit 2

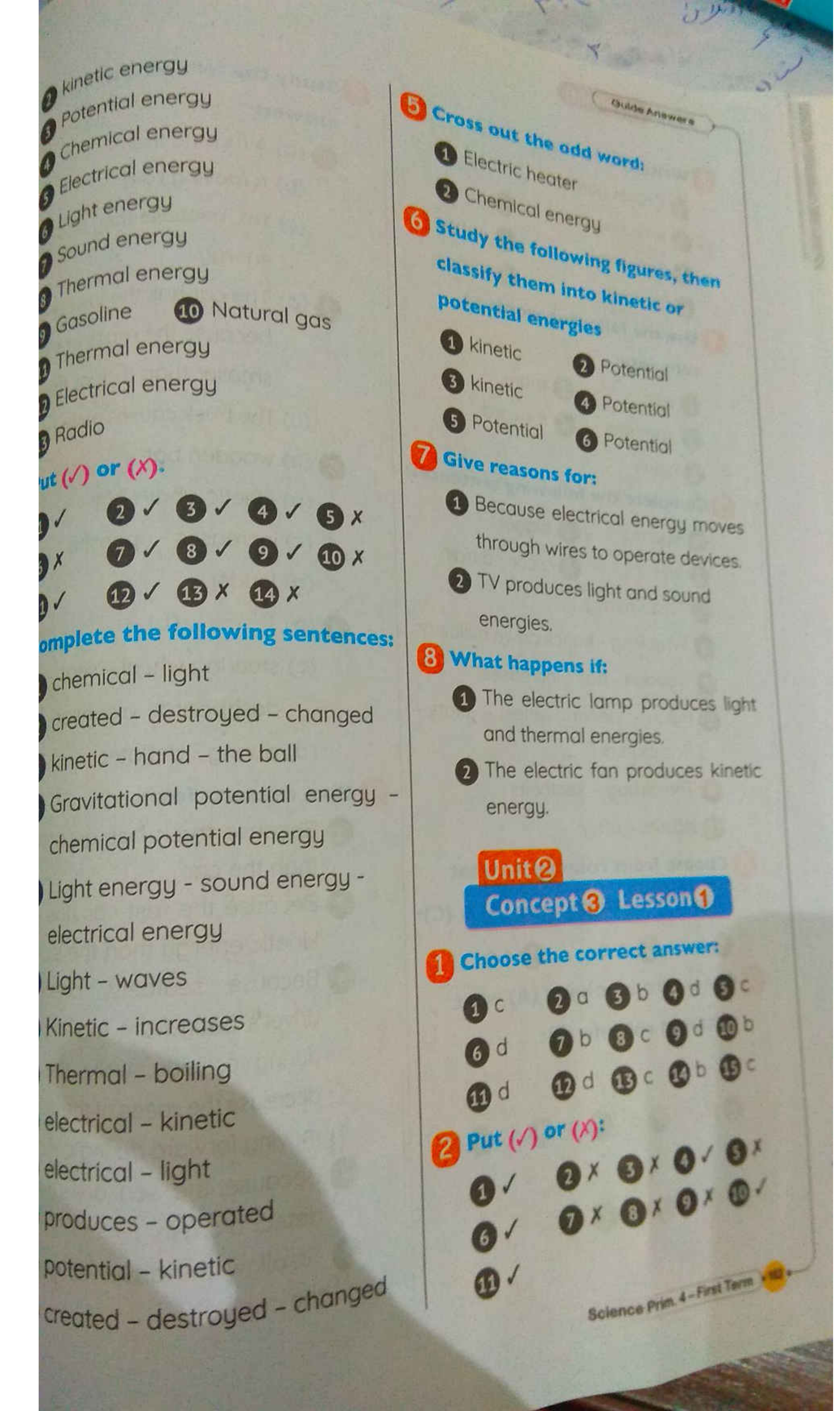
Concept 2 Lessons 3 & 4

1 Choose the correct answer:

1 d 2 c 3 b 4 c 5 d
6 a 7 b 8 c 9 b 10 c
11 d 12 d 13 c

2 Write the scientific term:

1 Potential energy



2 kinetic energy
3 Potential energy
4 Chemical energy
5 Electrical energy
6 Light energy
7 Sound energy
8 Thermal energy
9 Gasoline 10 Natural gas
11 Thermal energy
12 Electrical energy
13 Radio

ut (✓) or (✗).

1 ✓ 2 ✓ 3 ✓ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✓ 9 ✓ 10 ✗
11 ✓ 12 ✓ 13 ✗ 14 ✗

omplete the following sentences:

- chemical – light
- created – destroyed – changed
- kinetic – hand – the ball
- Gravitational potential energy - chemical potential energy
- Light energy - sound energy - electrical energy
- Light – waves
- Kinetic – increases
- Thermal – boiling
- electrical – kinetic
- electrical – light
- produces – operated
- potential – kinetic
- created – destroyed – changed

5 Cross out the odd word:

1 Electric heater
2 Chemical energy

6 Study the following figures, then classify them into kinetic or potential energies

1 kinetic 2 Potential
3 kinetic 4 Potential
5 Potential 6 Potential

7 Give reasons for:

1 Because electrical energy moves through wires to operate devices.
2 TV produces light and sound energies.

8 What happens if:

1 The electric lamp produces light and thermal energies.
2 The electric fan produces kinetic energy.

Unit 2

Concept 3 Lesson 1

1 Choose the correct answer:

1 c 2 a 3 b 4 d 5 c
6 d 7 b 8 c 9 d 10 b
11 d 12 d 13 c 14 b 15 c

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✓ 5 ✗
6 ✓ 7 ✗ 8 ✗ 9 ✗ 10 ✓
11 ✓

3 Write the scientific term:

1. Cricket game
2. Wrecking ball
3. Nylon
4. Car sensor
5. Airbag
6. Seatbelt
7. Airbag

4 Use the following words to complete:

1. less
2. more
3. opposite
4. forward
5. nylon

5 Complete the following sentences:

1. energy
2. bigger
3. less
4. a car - a train
5. Fast - heavy
6. Wrecking - knock down buildings
7. wooden - ball - increases
8. nylon - steering wheel - seats - dashboard
9. The airbag - seatbelts
10. inflates - after

6 Choose from column (A) what suits it in both columns (B) & (C):

1. b-c
2. a-b
3. c-a

7 Choose from column (A) what suits it in column (B):

(A):

1. c
2. e
3. a
4. d
5. b

(B):

1. e
2. b
3. d

8 Study the following figures, then answer:

1. (a) A moving train
   (b) A moving bike
   (c) Yes, because they have kinetic energy.
2. (a) The car has the lowest energy because the mass of the car is smaller than that of the truck.
   (b) The truck causes more damage.
3. (a) wooden bat
   (b) kinetic - bat - ball
   (c) increases - opposite
   (d) louder
4. (a) 1 (b) 2
   (c) steering wheel - seat - dashboard - a sensor
   (d) during - deflates

9 Give reasons for:

1. Because truck has greater mass than the car.
2. Because the fast car has greater kinetic energy than the slow car.
3. Because seatbelts prevent the driver's body from moving forward during collision, while the airbags decrease the speed of the driver while moving forward during collision.
4. Because the sensors of the car detect a crash.
5. To allow the driver to get out of the car.

What happens if:

1. Kinetic energy transfers from the heavy object to the light object and it causes more damage.
2. Kinetic energy transfers from the fast object to the slow object and it causes more damage.
3. Energy transfers from the bat to the ball and the speed of the ball increases in the opposite direction.

Unit 2

Concept 3 Lesson 2

Choose the correct answer:

1 d 2 c 3 a 4 c 5 a
6 b 7 c 8 c 9 c 10 d
11 b 12 d 13 d 14 c 15 d
16 c 17 d 18 b 19 a 20 b

Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓
6 ✗ 7 ✓ 8 ✗ 9 ✓ 10 ✗
11 ✗ 12 ✓ 13 ✗ 14 ✗ 15 ✗

Write the scientific term:

1. Collision
2. Kinetic energy
3. Speed
4. Meter (kilometer)
5. Second (hour)
6. Meter/second (Kilometer/hour)

Complete the following sentences:

1. vibrates- boy- traffic sign- sound- thermal
2. distance- time
3. meter- kilometer
4. second- hour
5. Meter/second- kilometer/hour
6. 3 m/sec
7. faster
8. more
9. fast-slow
10. the mass of the object - the speed of the object
11. faster
12. decreasing

5 Cross out the odd word:

1. Kg
2. Distance

6 Choose from column (A) what suits it in column (B):

1 d 2 a 3 b 4 c

7 Which object moves faster:

1. Car (A)
2. Car (B)

8 Study the following table then complete:

1. B- D
2. A- C

9 Study the following figures then answer the questions:

1. (a) car- traffic sign
   (b) car- bike (c) sound energy
2. Figure 1 causes more severe damage because the cars collide in the opposite directions.
3. (a) slower- decreases.
   (b) faster- increases.

10 Give reasons for:

1. Because the fast object has high speed, while the slow object has low speed.

2. Because during collision, kinetic energy transfers between the two objects also sound and thermal energies are produced.
3. Because when the speed of the object increases, its kinetic energy increases, and the force of collision increases along with the damage.

1 What happens if:

1. Transfer of energy occurs, sound and thermal energies are produced.
2. Its speed increases.
3. Its speed decreases.
4. The damage of collision becomes more severe.
5. The damage of collision becomes less severe.
6. Kinetic energy will decrease.

Unit 2

Concept 3 Lesson 3

1 Choose the correct answer:

1 c 2 c 3 d 4 c 5 b
6 a 7 b 8 c 9 b 10 c

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗
6 ✗ 7 ✓ 8 ✗

3 Complete the following sentences:

1 force 2 slower
3 engine 4 Kinetic
5 less 6 damage
7 changes much more
8 lightly- strongly.

4 Choose from column (A) what suits it in column (B):

1 d 2 a 3 b

5 Study the following figures, then answer the questions:

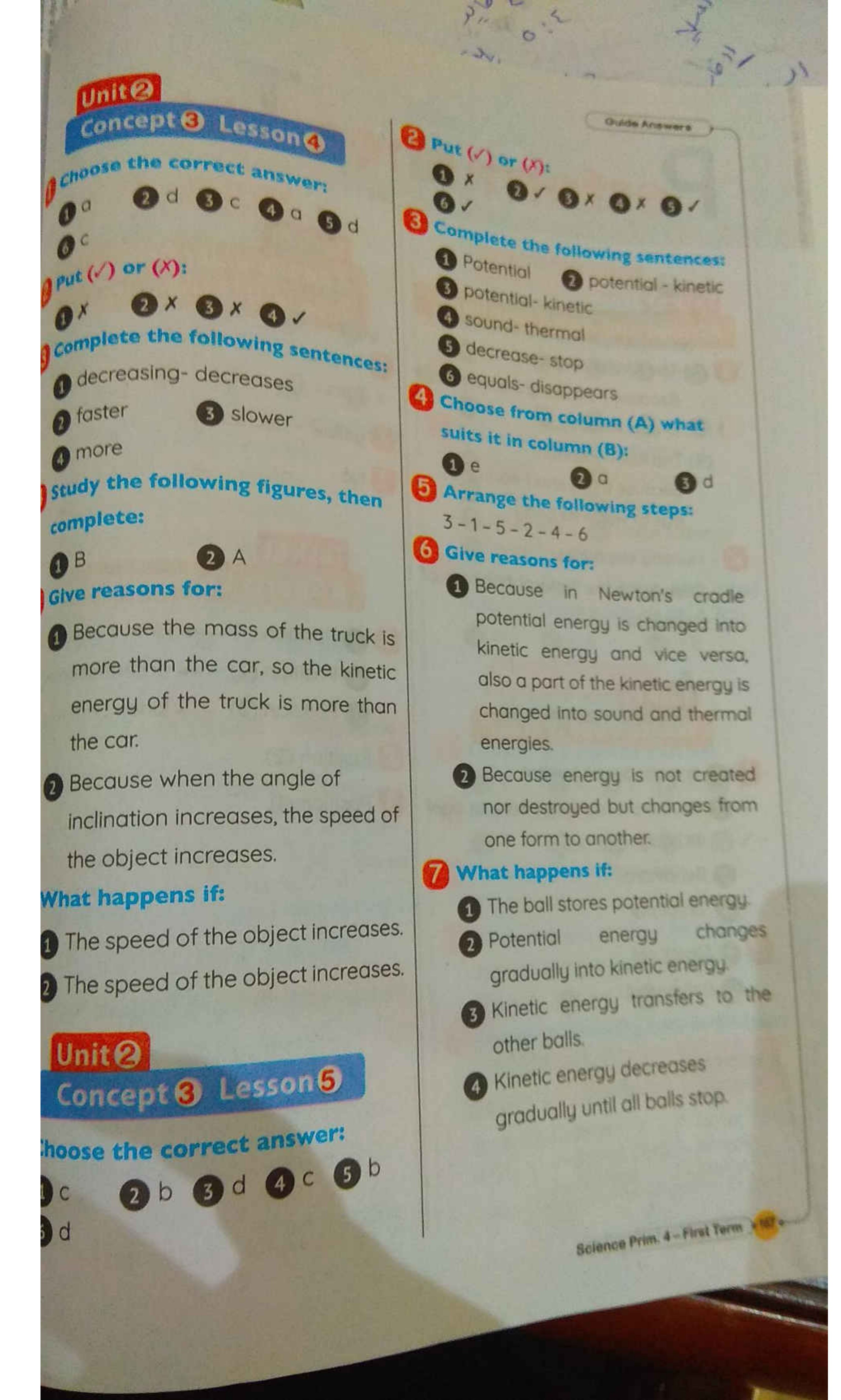
(a) 2 (b) 1 (c) 3
(d) 3- 2 (e) 3- 1

6 Give reasons for:

1. Because the heavy object has a big engine and consumes more fuel.
2. Because the mass of the truck is bigger than the mass of the car

7 What happens if:

1. Kinetic energy increases.
2. Kinetic energy increases.
3. He may be injured only and survive.
4. His life may be in danger.



Unit 2

Concept 3 Lesson 4

1 Choose the correct answer:

1 a 2 d 3 c 4 a 5 d
6 c

2 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✗ 4 ✓

3 Complete the following sentences:

1 decreasing- decreases
2 faster 3 slower
4 more

4 Study the following figures, then complete:

1 B 2 A

5 Give reasons for:

1 Because the mass of the truck is more than the car, so the kinetic energy of the truck is more than the car.

2 Because when the angle of inclination increases, the speed of the object increases.

6 What happens if:

1 The speed of the object increases.
2 The speed of the object increases.

Unit 2

Concept 3 Lesson 5

1 Choose the correct answer:

1 c 2 b 3 d 4 c 5 b
6 d

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓
6 ✓

3 Complete the following sentences:

1 Potential 2 potential - kinetic
3 potential- kinetic
4 sound- thermal
5 decrease- stop
6 equals- disappears

4 Choose from column (A) what suits it in column (B):

1 e 2 a 3 d

5 Arrange the following steps:

3 - 1 - 5 - 2 - 4 - 6

6 Give reasons for:

1 Because in Newton's cradle potential energy is changed into kinetic energy and vice versa, also a part of the kinetic energy is changed into sound and thermal energies.

2 Because energy is not created nor destroyed but changes from one form to another.

7 What happens if:

1 The ball stores potential energy.
2 Potential energy changes gradually into kinetic energy.
3 Kinetic energy transfers to the other balls.
4 Kinetic energy decreases gradually until all balls stop.

Performance Tasks

Task 1
African and Asian Elephants

1. (A) The African elephant
   Because it has long ears and legs to cool its body.
   (B) The Asian elephant
   Because it has short ears and legs to warm its body.
2. - Hunting elephants.
   - Destroying the natural habitats of elephants.

Task 2
Where Does It Live?

1. 1 In a hot desert habitat.
   2 Because it has large ears to cool its body.
   3 Behavioral
   4 Structural

1 Structural
2 Behavioral

Task 3
Can the Polar Bear Live in Hot Habitat?

1. Because it has thick fur and small ears.
2. yellow – decreases
3. No

Task 4
A Sports Competition

1. 1 Position (1) ⟶ kinetic energy
   2 Position (2) ⟶ potential energy
   3 Position (3) ⟶ kinetic energy
2. Position (2).
3. Position (1).

Concept Exams

Model Exam A

Unit (1) Concept (1)

1 Choose the correct answer:

1. b 2. d 3. d 4. b 5. d

2 Put (✓) or (✗):

1. ✗ 2. ✓ 3. ✗ 4. ✗ 5. ✗

3 What is the kind of adaptation in the following examples:

1. Structural adaptation
2. Behavioral adaptation
3. Structural adaptation
4. Behavioral adaptation
5. Behavioral adaptation

4 Compare between the two following processes:

P.O.C	Inhalation	Exhalation
Diaphragm	Contracts (Moves down)	Relaxes (Moves up)
Chest Size	Increases	Decreases
Air Rich in	Oxygen	Carbon dioxide

5 Classify these organs according to the system they belong to:

Respiratory System	Digestive System
- Pharynx - Diaphragm - Trachea - Nose - Lungs - Alveoli	- Pharynx - Stomach - Liver - Anus - Tongue - Liver - Small intestine

Model Exam B

Unit (1) Concept (1)

1 Choose the correct answer:

1. b 2. c 3. b 4. b 5. c

2 Put (✓) or (✗):

1. ✗ 2. ✓ 3. ✗ 4. ✓ 5. ✗

3 Label the following figure:

1. Mouth
2. Esophagus
3. Liver
4. Stomach
5. Pancreas
6. Large intestine
7. Small intestine

4 Choose from column (A) what suits it in both columns (B) & (C):

1. b-c 2. c-a 3. a-b

Model Exam A

Unit (1) Concept (2)

1 Choose the correct answer:

1. d 2. c 3. b 4. d 5. b

2 Put (✓) or (✗):

1. ✗ 2. ✓ 3. ✗ 4. ✗ 5. ✓

3 Arrange the following:

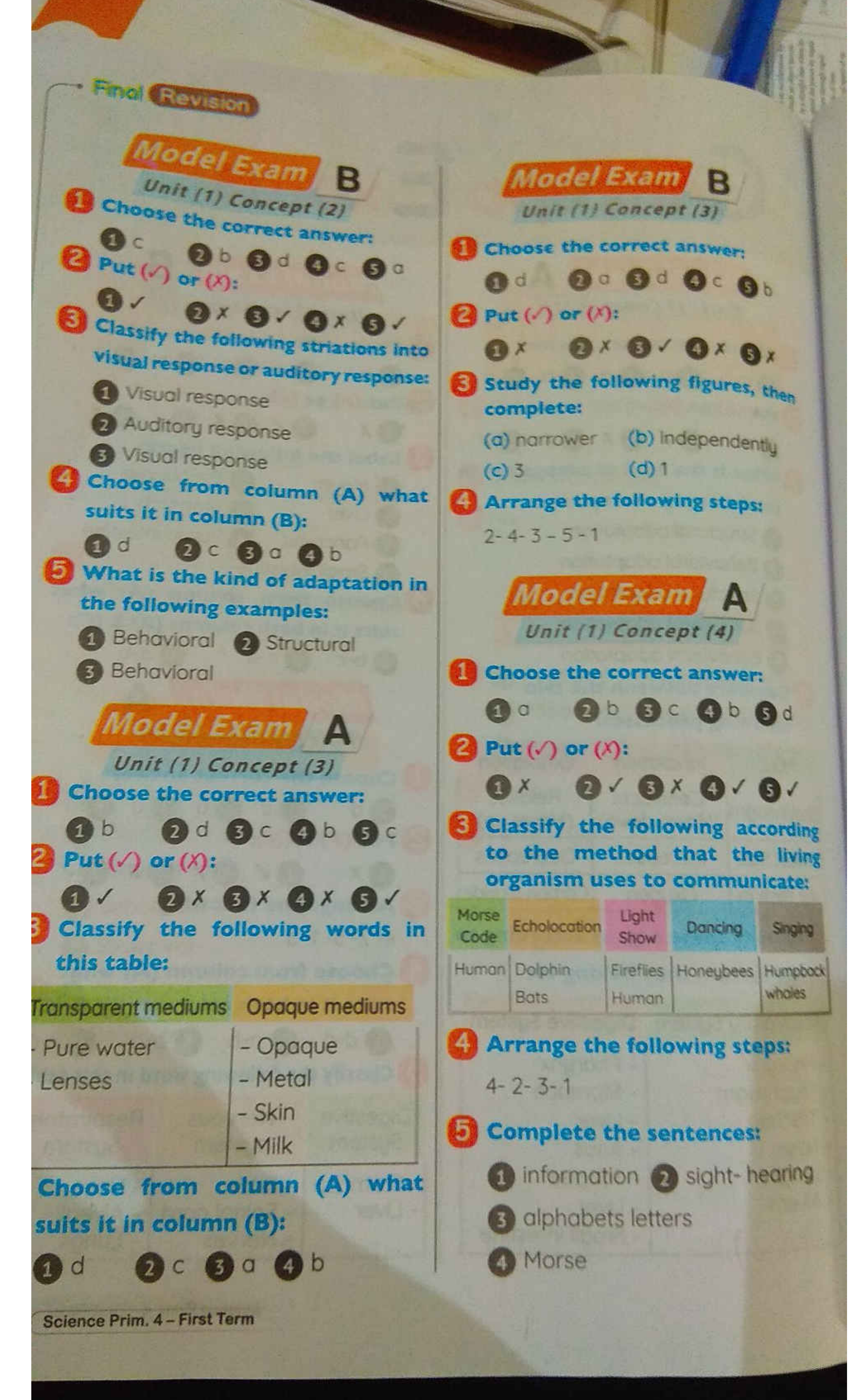
4- 2- 5- 1- 3

4 Choose from column (A) what suits it in both columns (B) & (C):

1. d-d 2. a-b 3. b-a 4. c-c

5 Classify the following word in this table:

Digestive System	Nervous system	Respiratory System
- Stomach - Liver	- Brain - Spinal cord - Nerves	- Nose - Alveoli - Lungs



Model Exam B

Unit (1) Concept (2)

1 Choose the correct answer:

1 c 2 b 3 d 4 c 5 a

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✓

3 Classify the following striations into visual response or auditory response:

1 Visual response

2 Auditory response

3 Visual response

4 Choose from column (A) what suits it in column (B):

1 d 2 c 3 a 4 b

5 What is the kind of adaptation in the following examples:

1 Behavioral 2 Structural

3 Behavioral

Model Exam A

Unit (1) Concept (3)

1 Choose the correct answer:

1 b 2 d 3 c 4 b 5 c

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓

3 Classify the following words in this table:

Transparent mediums	Opaque mediums
- Pure water	- Opaque
- Lenses	- Metal
	- Skin
	- Milk

Choose from column (A) what suits it in column (B):

1 d 2 c 3 a 4 b

Model Exam B

Unit (1) Concept (3)

1 Choose the correct answer:

1 d 2 a 3 d 4 c 5 b

2 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✓ 4 ✗ 5 ✗

3 Study the following figures, then complete:

(a) narrower (b) independently

(c) 3 (d) 1

4 Arrange the following steps:

2- 4- 3 - 5 - 1

Model Exam A

Unit (1) Concept (4)

1 Choose the correct answer:

1 a 2 b 3 c 4 b 5 d

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✓ 5 ✓

3 Classify the following according to the method that the living organism uses to communicate:

Morse Code	Echolocation	Light Show	Dancing	Singing
Human	Dolphin Bats	Fireflies Human	Honeybees	Humpback whales

4 Arrange the following steps:

4- 2- 3- 1

5 Complete the sentences:

1 information 2 sight- hearing

3 alphabets letters

4 Morse

Model Exam B
Unit (1) Concept (4)

1. Choose the correct answer:

1 b 2 c 3 d 4 b 5 b

2. Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✓ 4 ✓ 5 ✗

3. Study the following figures, then complete:

1 (3) - ant 2 (2) - firefly
3 (1) - honeybee
4 (4) -humpback whale

4. Choose from column (A) what suits it in both columns (B) & (C):

1 b-c 2 c-a 3 a-b

Model Exam A
Unit (2) Concept (1)

1. Choose the correct answer:

1 b 2 d 3 c 4 a 5 d

2. Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✗ 4 ✗ 5 ✗

3. Study the following figures, then classify them into balanced or unbalanced forces:

1 Balanced 2 Balanced
3 Unbalanced 4 Unbalanced

4. Choose from column (A) what suits it in column (B):

1 c 2 a 3 d 4 b

Model Exam B
Unit (2) Concept (1)

1. Choose the correct answer:

1 b 2 b 3 b 4 c 5 b

2. Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✓

3. Choose from column (A) what suits it in column (B):

1 b 2 c 3 d 4 a

4. Study the following figures, then classify them into pushing or pulling forces:

1 Pushing force 2 Pushing force
3 Pulling force 4 Pulling force

Model Exam A
Unit (2) Concept (2)

1. Choose the correct answer:

1 b 2 d 3 d 4 a 5 c

2. Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✓ 5 ✓

3. Complete the following diagram:

Energy - work

4. Study the following figures, then classify them into kinetic or potential energies:

1 Kinetic 2 Kinetic
3 Potential and kinetic 4 Potential
5 Potential

5. Study the following figure, then put (✓) or (✗):

1 ✓ 2 ✗ 3 ✓ 4 ✗ 5 ✓



Model Exam B

Unit (2) Concept (2)

1 Choose the correct answer:

1 c 2 b 3 c 4 c 5 b

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✓ 5 ✓

3 Study the following figure, then compete:

1 potential 2 kinetic- potential

3 no

4 Choose from column (A) what suits it in column (B):

1 d 2 c 3 b

Model Exam A

Unit (2) Concept (3)

Choose the correct answer:

1 b 2 d 3 c 4 a 5 c

Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓

Speed = distance ÷ time

= 600 m ÷ 150 sec = 4 m/sec

Arrange the following objects from faster to slower:

- 3 - 2

What happens if:

1 Its mass remains constant, while its kinetic energy increases

2 The person may be injured only and survive.

Model Exam B

Unit (2) Concept (3)

1 Choose the correct answer:

1 c 2 b 3 b 4 a 5 d

2 Put (✓) or (✗):

1 ✓ 2 ✗ 3 ✗ 4 ✗ 5 ✓

3 Which object moves faster:

Speed of car (A) = distance ÷ time

= 500 ÷ 10 = 50 m/sec.

Speed of car (B) = distance ÷ time

= 600 ÷ 20 = 30 m/sec.

Car (A) is faster.

4 Choose from column (A) what suits it in column (B):

1 c 2 a 3 b

5 What happens if:

- During collision, kinetic energ transfers and a part of the kineti energy changes into sound an thermal energies.

Model Exams

Model Exam 1

1 Choose the correct answer:

1 c 2 d 3 b 4 d 5 b

2 Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✗

3 Speed = distance ÷ time = 600 ÷ 6
= 100 km/hr.

4 Which of the following surfaces represents the reflection of light rays from a wooden spoon and why?

(B), because light rays reflect in different directions when they fall on a rough surface.

Model Exam 2

1 Choose the correct answer:

1 c 2 d 3 a 4 b 5 d

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓

3 Car (B) has higher speed because it covers a longer distance at the same time.

4 Label the following two processes, then answer the questions:

(A): inhalation (B): exhalation

1 It contracts and moves down.

2 It decreases.

Model Exam 3

1 Choose the correct answer:

1 b 2 c 3 d 4 a 5 c

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✗

3 Study the following figure, then choose the correct word:

(a) decreases - slower

(b) increases - faster

4 A Transparent B Opaque

Model Exam 4

1 Choose the correct answer:

1 b 2 d 3 c 4 d 5 c

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗

3 Speed of the yellow car
= distance ÷ time = 10 ÷ 5 = 2 m/sec

Speed of the green car = distance ÷ time
= 20 ÷ 5 = 4 m/sec.

The green car is faster.

4 Figure (2)

Model Exam 5

1 Choose the correct answer:

1 b 2 c 3 a 4 c 5 b

2 Put (✓) or (✗):

1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✗

3 Speed = distance ÷ time

= 1200 ÷ 20 = 60 m/sec

4 Classify the following words in the table:

Digestive System	Nervous System	Respiratory System
- Tongue - Anus - Liver - Stomach - Small Intestine	- Brain - Spinal cord - Nerves	- Lungs - Nose - Alveoli

Model Exam 6

1 Choose the correct answer:

1 b 2 c 3 a 4 b 5 b

2 The red car faster because it covers longer distance at the same time.

3 Choose from column (A) what suits it in column (B):

1 b 2 a 3 e 4 d 5 c

4 What is the types of adaptation in the following cases?

1 Behavioral 2 Structural

3 Structural 4 Behavioral

Model Exam 7

1 Choose the correct answer:

1 c 2 a 3 d 4 a 5 b

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗

3 Classify the following according to the sense that the living organism uses to communicate and survive:

Movement	Hearing Sense	Smell Sense	Touch Sense	Taste Sense
Bees	-Dolphins -Bats -Egyptian mongooses	Ants	Snakes	Panther chameleon

4 Speed = distance ÷ time= 200 ÷ 5

= 40 km/hr

Model Exam 8

1 Choose the correct answer:

1 b 2 c 3 d 4 b 5 c

2 Put (✓) or (✗):

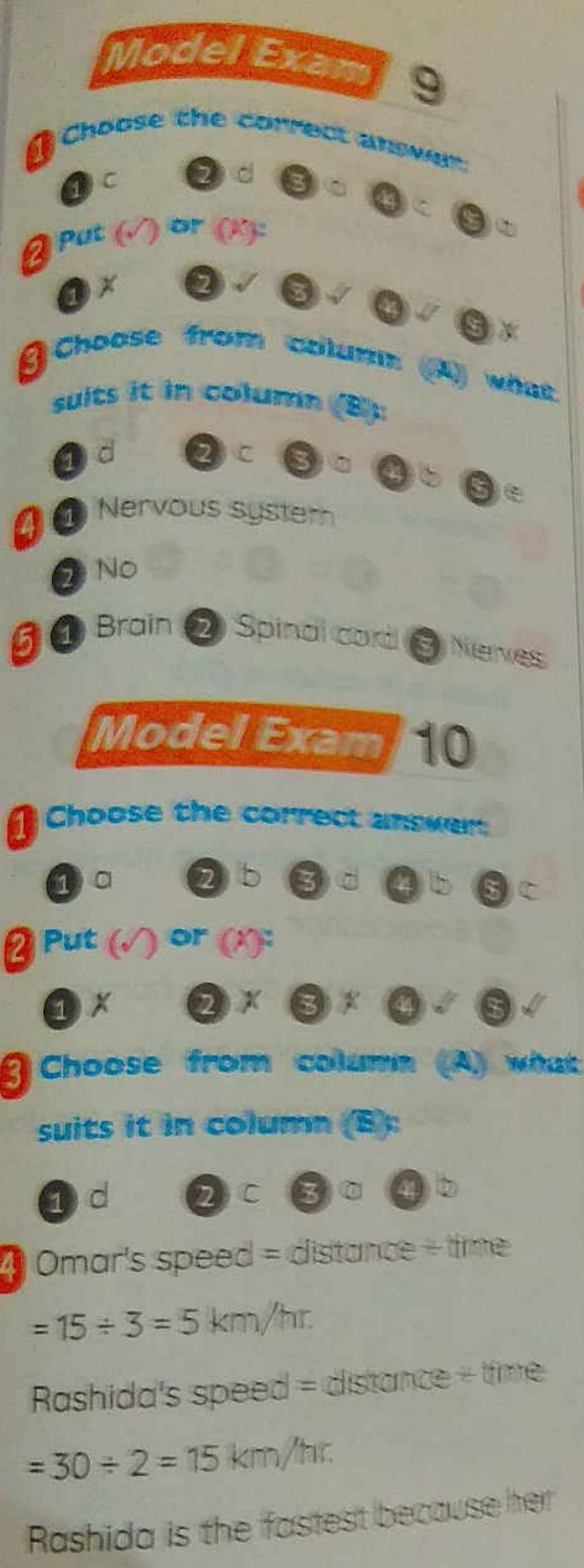
1 ✗ 2 ✓ 3 ✓ 4 ✗ 5 ✗

3 Classify the following words in the table:

Shiny Surfaces	Rough Surfaces	Transparent Surfaces
Mirror Metal	Wood	Glass Plastic

4 Choose from column (A) what suits it in both columns (B) & (C):

1 b-c 2 c-a 3 a-b



Model Exam 9

1 Choose the correct answer:

1 c 2 d 3 a 4 c 5 b

2 Put (✓) or (✗):

1 ✗ 2 ✓ 3 ✓ 4 ✓ 5 ✗

3 Choose from column (A) what suits it in column (B):

1 d 2 c 3 a 4 b 5 e

4 1 Nervous system

2 No

5 1 Brain 2 Spinal cord 3 Nerves

Model Exam 10

1 Choose the correct answer:

1 a 2 b 3 d 4 b 5 c

2 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✗ 4 ✓ 5 ✓

3 Choose from column (A) what suits it in column (B):

1 d 2 c 3 a 4 b

4 Omar's speed = distance ÷ time

= 15 ÷ 3 = 5 km/hr.

Rashida's speed = distance ÷ time

= 30 ÷ 2 = 15 km/hr.

Rashida is the fastest because her speed is greater.

Model Exam 11

1 Choose the correct answer:

1 c 2 c 3 a 4 b 5 c

2 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✓ 4 ✗ 5 ✗

3 Complete using the following words:

1 Fennec foxes 2 Bats

3 Owls 4 Bull sharks

4 Arrange the following steps:

- Light falls on objects.
- Light reflects on the eyes.
- Eye pupils allow the light to enter the eyes.
- Sensory receptors at the back of the eyes send signals to brain.
- Brain translates these signals.

Model Exam 12

1 Choose the correct answer:

1 d 2 b 3 b 4 c 5 a

2 Put (✓) or (✗):

1 ✗ 2 ✗ 3 ✗ 4 ✓ 5 ✓

3 Choose from column (A) what suits it in column (B):

1 d 2 c 3 a 4 b

4 (a) B (b) A - C

Model Exam 13

1 Choose the correct answer:

1 d 2 b 3 a 4 a 5 c

2 Choose from column (A) what suits it in column (B):

1 d 2 b 3 a 4 e 5 c

3 Speed = distance ÷ time

= 100 ÷ 2 = 50 m/sec.

4 - Light falls on the apple.

- Light reflects from the apple to the eye.
- Light enters the eye through the pupils.
- The sensory receptors of the eyes send signals to the brain to translate them.
- The brain translates and processes this information.

Model Exam 14

1 Choose the correct answer:

1 a 2 b 3 b 4 d 5 c

2 Choose from column (A) what suits it in column (B):

1 b 2 a 3 c 4 e 5 d

3 Arrange the following steps:

- The ball is raised up so it stores potential energy.
- The ball moves toward the other balls.
- When the ball hits the first ball.
- Kinetic energy transfers to all the other balls.
- The last ball moves.
- Some kinetic energy changes to sound and heat energies.

Model Exam 15

1 Choose the correct answer:

1 d 2 b 3 b 4 c 5 d

2 Choose from column (A) what suits it in column (B):

1 e 2 d 3 f 4 c 5 a 6 b

3 Answer the following questions:

1 Echolocation

2 Cats - deer - dogs - horses

3 Because snakes have a poor night vision and cannot see in the dark.